

MONTHLY WEATHER REVIEW.

VOL. XIX.

WASHINGTON, D. C., JULY, 1891.

No. 7.

BOARD OF EDITORS { Mr. Horace E. Smith, Chief Clerk Weather Bureau,
Professors Henry A. Hazen, Thomas Russell, and Charles F. Marvin, and
Mr. Edward B. Garrott, in charge of the Review Room.

INTRODUCTION.

This REVIEW is based on reports for July, 1891, from 2,402 regular and voluntary observers. These reports are classified as follows: 163 reports from Weather Bureau stations; 118 reports from United States Army post surgeons; 1,545 monthly reports from state weather service and voluntary observers; 33 reports from Canadian stations; 179 reports through the Central Pacific Railway Company; 364 marine reports through the co-operation of the Hydrographic Office, Navy Department; marine reports through the "New York Herald Weather Ser-

vice;" monthly reports from the local services of Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa-Weather and Crop Service, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, North and South Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Washington, and Wisconsin, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

CHARACTERISTICS OF THE WEATHER FOR JULY, 1891.

The month was the coolest July on record from the middle-eastern Rocky Mountain slope to the Atlantic coast, and at a majority of stations east of the 100th meridian, except in New England and east New York, the minimum temperature was the lowest ever noted for the season.

At stations on the middle and south Pacific coasts the month was the warmest July on record, and in the interior of the Pacific coast states south of Washington the maximum temperature was the highest ever reported for July.

The maximum temperature rose above 120° in the Colorado Desert, in the eastern part of San Diego county, Cal., and reached 122° at Furnace Creek, Death Valley, Cal.

FROST.

Frost occurred at intervals in New England, New York, Pennsylvania, the upper lake region, Wisconsin, and Minnesota. The frost of the 8th in Wisconsin and upper Michigan, of the 19th and 20th in upper Michigan and the north part of lower Michigan, of the 24th in South Dakota, of the 25th in lower Michigan, of the 28th in Connecticut, and of the 30th and 31st in north lower Michigan was reported injurious to tender vegetation.

PRECIPITATION.

The monthly precipitation was the greatest ever reported for July on the central New Jersey coast, in Arkansas, Indian Territory, south-central Kansas, north-central Montana, southeast Washington, and north-central California, and it was the least ever reported for July in New Mexico and extreme western Texas.

The monthly precipitation was generally in excess of the

July average in the Atlantic and east and west Gulf states, on the eastern slope of the Rocky Mountains, over the northern plateau, the west part of the middle plateau region, and along the Pacific coast between the 35th and 45th parallels; elsewhere it was generally deficient.

STORMS.

Local storms were most frequently reported in the Dakotas, Nebraska, Kansas, Iowa, Michigan, New York, and Pennsylvania. Among the more severe storms were those in the west Gulf states and the lower Mississippi valley on the 5th and 6th, when great damage was done by high water at Galveston, Tex., on the 5th, and ten persons were killed and a number injured by a tornado at Baton Rouge, La., on the 6th; the storm at Superior and West Superior, Wis., on the 16th, when five persons were killed by a falling building; and the tornado in Maryland on the 18th, when five persons were seriously injured.

FLOODS.

Considerable damage was caused along the Missouri River south of Pierre, S. Dak., by high water during the first part of the month. The river cut its banks and changed its channel at several points, causing considerable damage to farm property.

DROUGHT.

Drought prevailed in parts of lower Michigan, South Dakota, Kansas, Texas, Arizona, and Washington. In the early part of the month the weather was very dry in eastern Wisconsin, southern Illinois, southern Indiana, and parts of Kentucky.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The normal distribution of atmospheric pressure over the United States in July is influenced by the high areas of the Atlantic and Pacific oceans, and the low areas of the southern plateau region and northeast British America. Over the east Gulf states and Florida and on the north Pacific coast the

mean pressure generally rises above 30.05, and over the west part of the southern plateau region it falls below 29.85. In the British Possessions north of North Dakota and Montana the mean pressure is generally below 29.90.

For the current month the mean pressure was highest east

of the Mississippi and south of the Ohio rivers and on the coast of Washington, where it was above 30.05, and lowest over the west part of the southern plateau, where it was below 29.80. In Alberta and the east part of British Columbia the mean pressure was below 29.90.

A comparison of the pressure chart for July, 1891, with that of the preceding month shows an increase in pressure over the entire country, save on the middle Pacific coast and in east Ontario, where there was a slight decrease. The most marked increase in pressure occurred in the British Possessions north of North Dakota and east Montana, where it exceeded .15, and the increase was more than .10 from the east part of the Rocky Mountain region over the central valleys, in Nova Scotia, and Florida.

The mean pressure was above the normal, except from the lower Mississippi valley westward to southern California, and thence northward along the Pacific coast to British Columbia. The most marked departure above the normal pressure was noted in Nova Scotia and Manitoba, where it exceeded .10. In districts where the mean pressure was below the normal the departure was less than .05.

HIGH AND LOW AREAS.

The table at the end of this chapter exhibits some of the more prominent characteristics of the high and low areas charted for July, 1891.

HIGH AREAS.

Five high areas appeared during the month, the average number noted for July during the last 17 years being 5.9. All of the high areas charted for the current month were apparently offshoots of the Pacific area of high pressure, and moved from the north Pacific coast in a generally east-southeast course and disappeared over the north Atlantic Ocean. The average period of transit of the high areas was 5.8 days, and the average rate of advance was 23 miles per hour. In the case of numbers I and IV there was a transfer of highest pressure from one point to another within an extensive area of high pressure; these areas are, therefore, given sub-numbers, and are, in each instance, considered in the discussion and table as single areas. The following is a description of the high areas referred to:

I.—Was located off the north Pacific coast on the 1st, and the morning of the 2d, when the pressure was highest over Alberta, the high area extended over the middle Missouri valley. The evening report of the 2d showed high pressure over the Dakotas and Nebraska, and during the next 24 hours the area moved to Iowa, and the evening of the 3d an elongated area of high pressure extended from Minnesota to west Tennessee. The morning of the 4th the pressure was highest in Minnesota, from which region the centre of the area moved southeast and disappeared off the North Carolina coast the night of the 6th. The highest pressure noted during the passage of this high area was 30.16 at Winnipeg, Man., the morning of the 4th, and at stations in the upper Mississippi and middle Ohio valleys the morning of the 5th.

II.—Appeared on the north Pacific coast on the 5th and moved thence to Manitoba by the 7th, whence it passed southeast to Wisconsin by the 9th, and thence south of east and disappeared off the south New England coast the night of the 10th. The passage of this area was attended by unusually cool weather east of the Rocky Mountains from the 7th to 10th. On the 8th heavy frost was reported in the country surrounding Sault de Ste. Marie, Mich.; damage by frost was reported in the cranberry district about Berlin, Wis., and light frost was reported in eastern Iowa and central Illinois. Light frost was reported at Yellow Springs, Ohio, on the 9th. The greatest abnormal fall in temperature in 12 hours, 24°, occurred at Kansas City, Mo., on the 7th, and the highest pressure, 30.36, was noted at Port Huron, Mich., the morning of the 10th.

III.—Appeared off the Oregon coast on the 11th, passed to Montana by the 13th, thence southeast to the lower Ohio valley by the morning of the 16th, whence it moved south of east

and disappeared off the North Carolina coast the night of the 16th. Attending the passage of this area heavy frost was reported at Lead City and Bald Mountain, S. Dak., on the 14th, and the highest pressure noted, 30.34, occurred at North Platte, Nebr., the morning of the 14th.

IV.—Was central off the north Pacific coast on the 15th, passed to north Montana by the morning of the 16th, and thence to the middle Missouri valley by the 17th, where it remained nearly stationary during that and the following date. By the morning of the 19th the highest pressure in this area appeared north of Minnesota, whence it moved south of east and disappeared off the Nova Scotia coast the night of the 22d. In advance of this area exceptionally cool weather prevailed east of the Rocky Mountains on the 18th, and attending its passage north of the Lake region light frost occurred on the 20th in upper Michigan and the north part of lower Michigan. The highest pressure, 30.42, was noted at Rockliffe, Ont., the morning of the 21st.

V.—Was located off the north Pacific coast on the 20th, moved to the region north of Montana by the 23d, and passing thence southeastward disappeared off the south Atlantic coast the night of the 27th. Attending the passage of this area light frost was reported in North Dakota on the 24th. During the 27th unusually cool weather prevailed in the northeast part of the country. On the 28th, when the pressure was high off the Atlantic coast from Nova Scotia to Florida, light frost was reported in Connecticut. The highest pressure noted in connection with this area, and the highest pressure reported for the month, was 30.44, at Edmonton, Alberta, the morning of the 23d.

During the passage of a short-lived high area over the upper lake region the night of the 30th-31st, light frost was reported in parts of north lower Michigan.

LOW AREAS.

The normal distribution of atmospheric pressure in July favors the passage of storms in high latitudes over the eastern part of the country, and a reference to storm-track charts of the last 19 years shows that the storms of July generally follow a course over or north of the Lake region and Saint Lawrence Valley.

During the current month 8 low areas appeared within the region of observation, the average number noted for July during the last 19 years being 9.6. One low area apparently developed over the west part of the lower lake region, 4 advanced from the British Northwest Territory, 2 originated over the plateau region, one of which passed eastward south of the Ohio River, and one moved northward from the west part of the Gulf of Mexico and united over Arkansas with a low area which had advanced from the northwest.

During the 9th and 10th a feeble low area, not charted, moved from the east part of the Gulf of Mexico over north Florida.

The following is a description of the low areas whose tracks are plotted on Chart I:

I.—Advanced from the British Northwest Territory the last day of June and was central over the Dakotas as a slight barometric depression the morning of the 1st, whence it moved to southern Iowa by the evening of the 2d, and passing thence east-northeast disappeared over the Gulf of Saint Lawrence during the 7th, its rate of advance being but 15 miles per hour. The lowest pressure noted in connection with this area was 29.56, at Rockliffe, Ont., the morning of the 4th.

An area of general rain which extended over the north part of the central valleys and the Lake region on the 1st moved eastward, reached southward over Virginia on the 3d and 4th, and disappeared east of New England after the 6th.

Severe local storms occurred in Iowa and Missouri on the 1st; in Wisconsin, the Dakotas, Illinois, Missouri, and Kansas on the 2d; in New York, Pennsylvania, and Maryland on the 3d; and heavy thunderstorms were reported at Boston, Mass., and Norfolk, Va., the morning of the 4th.

II.—Appeared in the Valley of the Columbia River on the 3d, moved thence to the region north of Montana by the 5th, thence southeastward to Arkansas by the 7th, where it united with low area III which had advanced from the west Gulf, thence eastward, passing off the North Carolina coast during the afternoon of the 8th, and thence northeastward to a position south of Nova Scotia by the evening of the 9th.

On the 5th, when the course of this low area changed to southeast, an elongated area of high pressure, high area I, extended from Manitoba to Tennessee and low area III was central on the west Gulf coast. The apparent effect of this distribution of pressure was to deflect low area II southeastward. After the union of low areas II and III high area II occupied a position to the north and northwest, causing the storm to assume an easterly course to the Atlantic coast. The lowest pressure noted in connection with this low area was 29.56, at Medicine Hat, N. W. T., the evening of the 4th.

Light rain fell over the east part of the middle plateau and on the middle-eastern slope of the Rocky Mountains on the 4th; on the northeast slope of the Rocky Mountains on the 5th; in the middle Missouri valley and on the middle-eastern slope on the 6th; heavy rain in the east Gulf states and the Missouri and Ohio valleys on the 7th; and heavy rain in the east Gulf states, the upper Ohio valley, and the middle and south Atlantic states on the 8th.

A severe wind and duststorm occurred at Walla Walla, Wash., on the 3d, the wind exceeding 40 miles per hour; on the 4th a thunder, wind, and hailstorm was reported at Salt Lake City, Utah; on the 5th a heavy thunder, wind, rain, and hailstorm occurred at Rapid City, S. Dak.; on the 6th and 7th thunderstorms, with heavy rain, visited east Iowa; on the 7th heavy rain attended thunderstorms in east Kansas and Nebraska, west Missouri, and north Texas; and on the 8th heavy rain fell in east Mississippi, a heavy gale prevailed over Chesapeake Bay, and severe local storms occurred in Maryland and Virginia.

III.—The presence of a low area over the west part of the Gulf of Mexico was indicated by reports of the 3d, and by the evening of the 4th the storm was apparently central southeast of the mouth of the Rio Grande River, whence it moved northward, passing near and west of Galveston, Tex., the evening of the 5th, and thence east of north, uniting over Arkansas during the 7th with low area II which had advanced from the northwest. At 9.30 p. m., 75th meridian time, the barometer read 29.24 at Galveston, Tex., having fallen .38 inch in 14 hour. From this time the barometer rose and the wind shifted suddenly from southeast to southwest.

Light rain fell on the west Gulf coast the night of the 3d; heavy rain fell in that region on the 4th; on the 5th the area of heavy rain extended over the lower Mississippi valley; and on the 6th and 7th very heavy rainfalls were reported in the Mississippi Valley south of Tennessee.

A storm of wind and rain began at Galveston, Tex., the night of the 4th and continued during the 5th, and low-lying sections of the city were inundated by a storm-wave. On the 5th and 6th destructive local storms occurred in the west Gulf states and the lower Mississippi valley. At Baton Rouge, La., the state penitentiary was wrecked and ten convicts killed and a number injured. Many other houses were destroyed or damaged at that place.

IV.—Appeared central over the west part of the lower lake region the morning of the 7th, moved to southeast New York by the evening of that date, and passing thence northeastward along the New England coast disappeared east of Cape Breton Island the night of the 8th, the lowest pressure, 29.54, being noted at Eastport, Me., the morning, and at Sydney, C. B. I., the evening of the 8th.

Rain fell on the 7th from the Lake region and Ohio Valley over the middle Atlantic states and New England, and during the early part of the 8th heavy rain fell in New England.

Severe local storms were reported in South Carolina, Maryland, and Pennsylvania on the 7th.

V.—Was apparently an offshoot of the southern plateau area of low pressure, and the evening of the 10th was central over the east part of the middle plateau region, whence it moved slowly northeastward to the upper valley of the Red River of the North by the 12th, and passing thence eastward over the upper lakes and the Saint Lawrence Valley disappeared north of the Gulf of Saint Lawrence during the 16th, the lowest pressure noted being 29.56, at Pueblo, Colo., the evening of the 11th, and at Moorhead, Minn., the evening of the 12th. From the 7th to 10th, inclusive, the pressure was low north of Montana, and light rains fell over the northern Rocky Mountain regions.

Rain fell in the middle Missouri valley the afternoon of the 10th; from the middle and northeast slopes of the Rocky Mountains to the upper lake region on the 11th; in the Missouri Valley on the 12th; in the upper Mississippi valley and Lake region on the 13th; from the Lake region and Ohio Valley eastward over the middle Atlantic and New England states on the 14th and 15th; and on the 16th the weather was clearing in the middle Atlantic and New England states.

Severe local storms occurred in the Dakotas and Michigan on the 12th; in Michigan, Wisconsin, the upper Mississippi and lower Missouri valleys on the 13th; in New York, Pennsylvania, Maryland, Michigan, and the Ohio Valley on the 14th; and in Maryland, New Jersey, New York, and Maine on the 15th.

VI.—Advanced from the British Northwest Territory and was central over Manitoba the evening of the 15th, whence it moved southeastward to the lower lake region by the 18th, and passing thence along the Saint Lawrence Valley disappeared over the Gulf of Saint Lawrence during the 20th, the lowest pressure noted during its passage being 29.68, at Kingston, Ont., the evening of the 18th.

Rain fell in Manitoba, the Missouri Valley, and Minnesota on the 16th; in the Missouri, middle Mississippi, and Ohio valleys, and the Lake region on the 17th; from the Lake region and the Ohio Valley to the Atlantic coast from Florida to Maine on the 18th; and along the Atlantic coast from Florida northward on the 19th.

On the 16th destructive storms occurred in north Wisconsin and Minnesota, Michigan, Iowa, and Nebraska; on the 17th in the Dakotas and Michigan; and on the 18th in Ohio and the middle Atlantic states. A heavy gale prevailed along the New Jersey coast, and a well-defined tornado visited southern Maryland on the 18th.

VII.—Advanced from the British Northwest Territory and was central over west Minnesota the evening of the 21st, whence it moved to the north coast of Lake Superior by the morning of the 23d, and passing thence eastward disappeared over the Gulf of Saint Lawrence during the 25th, the lowest pressure, 29.62, being noted at Minnedosa, Man., the morning of the 22d.

Rain fell in the middle and north parts of the central valleys on the 21st; the rain extended over the Lake region on the 22d; from the Lake region and middle Mississippi valley to the middle Atlantic coast on the 23d; rain fell from the east part of the Lake region and upper Ohio valley over the middle Atlantic and New England states on the 24th; and in the middle Atlantic and New England states on the 25th.

Destructive hailstorms occurred in the Dakotas, Iowa, Nebraska, and Minnesota on the 21st; severe thunder and hailstorms in Kansas and north Iowa the night of the 21st-22d; wind and hailstorms in Kansas, South Dakota, and Minnesota, and heavy storms in western Pennsylvania on the 22d; thunderstorms in the middle Mississippi valley and the lower lake region the night of the 22-23d; in the middle Ohio valley and the lower lake region on the 23d; in Ohio, West Virginia, Maryland, Pennsylvania, and New York on the 24th; and in the Atlantic coast states from North Carolina to New England on the 25th.

VIII.—Advanced from the British Northwest Territory, and the evening of the 28th was central north of Lake Superior, whence it moved southeastward and passed off the New Jer-

sey coast during the 30th. From this position the storm-center assumed a northeast course, and on the 31st was central east of Cape Breton Island. The abnormal southeast course of this low area during the 29th and 30th was apparently due to the presence on those dates of an area of high pressure over the Gulf of Saint Lawrence. On the 30th the storm apparently divided, one part moving north of east over the Saint Lawrence Valley, where it dissipated, and the other passing southeast to northern New Jersey. The lowest pressure noted in connection with this low area was 29.48, at Sydney, C. B. I., the evening of the 31st.

On the 28th rain fell in the central valleys and the Lake region, and very heavy rainfalls occurred in the Gulf and south Atlantic states. On the 29th rain was general in the

central valleys and eastward to the Atlantic coast, very heavy rain falling in the Gulf States and Tennessee. On the 30th rain fell east of the Mississippi River, and during the 31st the rain area passed east of the middle Atlantic and New England states.

On the 26th and 27th, when this low area was forming or approaching over the British Northwest Territory, severe local storms occurred in South Dakota and Nebraska; on the 28th destructive storms were reported in Minnesota, the Dakotas, and Iowa, and southward in the central valleys to north Texas; on the 29th from the middle Mississippi valley over the Lake region, the Ohio Valley and Tennessee, and the middle Atlantic states; and on the 30th in the middle Atlantic states and the lower lake region.

Tabulated statement showing principal characteristics of areas of high and low pressure.

| Barometer. | First observed. | | | Last observed. | | | Duration. | Velocity per hour. | Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity. | | | | | | | | | |
|-------------|-----------------|---------|----------|----------------|----------|----------|-----------|------------------------------|--|-------|---------------------------|----|----|--------------------------|-----------------|-------|-----|--|
| | Date. | Lat. N. | Long. W. | Lat. N. | Long. W. | Station. | | | Rise. | Date. | Station. | | | Direction. | Miles per hour. | Date. | | |
| | | | | | | | | | | | | | | | | | | |
| High areas. | | | | | | | | | | | | | | | | | | |
| I | 1 | 48 | 126 | 34 | 76 | 5.0 | 23 | Calgary, N. W. T | .32 | 1 | Sacramento, Cal | 15 | 2 | Dodge City, Kans | se. | 44 | 4 | |
| II | 5 | 47 | 126 | 40 | 70 | 5.0 | 26 | do | .54 | 6 | Kansas City, Mo | 24 | 7 | Chicago, Ill | ne. | 36 | 8 | |
| III | 11 | 45 | 126 | 35 | 74 | 5.0 | 26 | Fort Assiniboine, Mont | .42 | 12 | Walla Walla, Wash | 26 | 10 | Pierre, S. Dak | nw. | 30 | 13 | |
| IV | 15 | 46 | 125 | 44 | 62 | 7.0 | 19 | Rockliffe, Ont | .26 | 20 | Sacramento, Cal | 17 | 16 | Dodge City, Kans | sw. | 36 | 17 | |
| V | 20 | 47 | 126 | 32 | 78 | 7.0 | 20 | Winnipeg, Man | .50 | 23 | Qu'Appelle, N. W. T | 20 | 22 | Pueblo, Colo | n. | 28 | 25 | |
| Mean | | | | | | | | | .41 | | | | | | | 35 | ... | |
| Low areas. | | | | | | | | | | | | | | | | | | |
| I | 1 | 47 | 100 | 49 | 64 | 6.0 | 15 | Port Huron, Mich | .24 | 3 | Fort Buford, N. Dak | 12 | 1 | *Chicago, Ill | ne. | 50 | 3 | |
| II | 3 | 46 | 119 | 43 | 65 | 6.0 | 27 | Calgary, N. W. T | .36 | 3 | Knoxville, Tenn | 12 | 2 | Abilene, Tex | nw. | 57 | 5 | |
| III | 4 | 25 | 96 | 34 | 93 | 2.5 | 12 | Galveston, Tex | .22 | 5 | Abilene, Tex | 14 | 6 | Galveston, Tex | se. | 60 | 5 | |
| IV | 7 | 42 | 83 | 47 | 60 | 1.5 | 35 | Sydney, C. B. I | .22 | 5 | Norfolk, Va | 8 | 7 | Block Island, R. I | n. | 36 | 8 | |
| V | 10 | 40 | 108 | 50 | 65 | 5.5 | 18 | Salt Lake City, Utah | .30 | 10 | Eastport, Me | 20 | 16 | Bismarck, N. Dak | ne. | 48 | 12 | |
| VI | 15 | 52 | 100 | 49 | 65 | 4.5 | 19 | Minnedosa, Man | .28 | 15 | Green Bay, Wis | 15 | 16 | Milwaukee, Wis | sw. | 48 | 13 | |
| VII | 21 | 52 | 101 | 50 | 65 | 3.5 | 21 | Battleford, N. W. T | .42 | 21 | Qu'Appelle, N. W. T | 16 | 22 | Yankton, S. Dak | sw. | 42 | 18 | |
| VIII | 28 | 51 | 93 | 46 | 58 | 2.5 | 35 | Sydney, C. B. I | .46 | 31 | Rapid City, S. Dak | 16 | 28 | Yankton, S. Dak | n. | 50 | 21 | |
| Mean | | | | | | | | | .33 | | | | | | | 49 | ... | |

*4th, wind reached 56 miles per hour from the sw. at Mount Killington, Vt. †15th, wind reached 78 miles per hour from the sw. at Green Mountain, Me.

NORTH ATLANTIC STORMS FOR JULY, 1891 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of depressions that appeared over the west part of the north Atlantic Ocean during July, 1891, are shown on Chart I. These paths have been determined from international observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Generally fine weather prevailed over the north Atlantic Ocean during the month, and no storms of marked severity occurred along the trans-Atlantic steamship routes. In July of preceding years storms of marked strength have seldom been encountered in the middle latitudes of the north Atlantic Ocean, the most destructive storms of the month generally occurring in the tropical or sub-tropical regions.

July, 1891, opened with low pressure from coast to coast. A storm which was central south of Nova Scotia June 30th was located over the Grand Banks, with central pressure about 29.60 (752), whence it moved northeast over the Grand Banks, and passing eastward between latitude north 50° and 55° disappeared north of the British Isles after the 6th. This storm was the most important noted for the month, and on the 5th and 6th, when central west of the British Isles, it was attended with pressure falling to about 29.50 (749) and fresh gales. On the 6th and 7th a storm, low area I, was central over the Gulf of Saint Lawrence, and by the morning of the 8th had united with low area IV, which advanced along the New England coast to the Gulf of Saint Lawrence during the 8th. Advancing northeastward over Newfoundland this storm

disappeared north of the region of observation by the 9th. On the morning of the 9th a storm which was a continuation of low areas II and III, was central off the middle Atlantic coast, whence it moved northeast and apparently dissipated south of Nova Scotia. From the 10th to the 12th a barometric depression of slight depth which had apparently advanced from the east Gulf moved northeastward off the south Atlantic coast, with fresh to strong gales. During the second decade of the month low pressure prevailed over mid-ocean, and the pressure was low over the British Isles from the 16th to the 20th. The morning of the 16th a storm which was a continuation of low area V was central near Anticosti Island, Gulf of Saint Lawrence, whence it passed north-northeast and disappeared north of the region of observation after the 17th. On the 26th a storm, low area VII, was central over the west part of the Gulf of Saint Lawrence, whence it apparently moved southward over Nova Scotia by the morning of the 27th, in which region it apparently disappeared. The evening of the 30th a storm, low area VIII, was central off the New Jersey coast, whence it moved northeast and the morning of the 31st was central east of Cape Breton Island.

FOG IN JULY.

The limits of fog-belts west of the 40th meridian, as reported by shipmasters, are shown on Chart I by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on 21 dates; between the 55th and 65th meridians on 12 dates; and west of the 65th meridian on 10 dates. Com-

pared with the corresponding month of the last 3 years the dates of occurrence of fog east of the 65th meridian numbered 3 less than the average; west of the 65th meridian the dates of fog numbered one more than the average.

The fog reported along the trans-Atlantic routes west of the 40th meridian, and at Weather Bureau stations along the New England and middle Atlantic coasts, generally attended the advance or passage of general storms.

OCEAN ICE IN JULY.

The table below shows that for July, 1891, ice was reported about $\frac{1}{2}$ ° north and about 5° west of the average eastern and southern limits of Arctic ice for the month as determined from reports of the last 8 years. The southernmost ice reported was a large iceberg observed on the 28th, and the easternmost ice reported was a large iceberg noted on the 7th in the positions given in the table. The ice reported was confined to the regions lying between the southeast Newfoundland coast and the 48th meridian, and from the 50th meridian through the Straits of Belle Isle. Numerous large icebergs and heavy pack ice were reported in the Straits of Belle Isle throughout the month. Compared with the corresponding

month of previous years the ice reported for the current month was deficient in quantity. The positions of icebergs and field ice reported for July, 1891, are shown on Chart I by ruled shading.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for July during the last 8 years:

| Month. | Southern limit. | | Eastern limit. | | |
|-----------------|-----------------|----------|------------------|---------|----------|
| | Lat. N. | Long. W. | Month. | Lat. N. | Long. W. |
| July, 1883..... | 42 42 | 49 57 | July, 1883..... | 46 47 | 45 44 |
| July, 1884..... | 46 24 | 50 02 | July, 1884..... | 48 36 | 46 28 |
| July, 1885..... | 42 14 | 48 30 | July, 1885..... | 48 00 | 44 00 |
| July, 1886..... | 42 59 | 49 18 | July, 1886*..... | 45 52 | 34 30 |
| July, 1887..... | 43 30 | 50 05 | July, 1887..... | 52 04 | 41 16 |
| July, 1888..... | 46 30 | 54 00 | July, 1888..... | 47 40 | 50 10 |
| July, 1889..... | 44 49 | 47 45 | July, 1889..... | 45 50 | 40 00 |
| July, 1890..... | 41 25 | 47 30 | July, 1890†..... | 50 08 | 38 45 |
| July, 1891..... | 43 16 | 49 45 | July, 1891..... | 47 02 | 48 00 |
| Mean | 43 45 | 49 19 | Mean | 48 00 | 42 59 |

*An iceberg and field ice. †On the 10th a small piece of ice was reported in N. 48° 33', W. 24° 11'.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

Many of the voluntary stations do not have standard thermometers or shelters.

The distribution of mean temperature over the United States and Canada for July, 1891, is exhibited on Chart II by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Weather Bureau. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the average for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Weather Bureau represents the mean of the maximum and minimum temperatures.

At stations on the Southern Pacific Railroad, in the east part of San Diego county, Cal., and at Furnace Creek, Death Valley, Cal., the mean temperature was above 100. The mean temperature was above 90 in adjoining parts of Arizona and southeast California, and was above 80 in Florida, southern Georgia, along the immediate east Gulf coast, in Louisiana, Texas, extreme southern New Mexico, southern and western Arizona, in California south of the 37th parallel, except along the coast, and in the San Joaquin and Sacramento valleys. The mean temperature was lowest at elevated stations in central Colorado, where it was below 50, and it was below 60 in extreme eastern and western Nova Scotia, the lower Saint Lawrence valley, over the north part of the upper lake region, in Manitoba, and along the immediate Pacific coast north of San Francisco, Cal.

DEPARTURES FROM NORMAL TEMPERATURE.

The mean temperature was generally above the normal from Alberta and British Columbia southward over the Pacific coast states, and from the southern plateau region over the Rio Grande Valley. It was also slightly above the normal in the lower Saint Lawrence Valley. Over the middle plateau region, and from the eastern slope of the Rocky Mountains to the Atlantic coast from southern Florida to Nova Scotia, the mean temperature was below the normal. The greatest departure above the normal temperature was noted in the Sacramento Valley, where it exceeded 2, and the greatest departure below the normal temperature occurred in the Lake region, the Missouri, upper Mississippi, and upper Ohio valleys, and in the western part of the middle and south Atlantic states, where it exceeded 5.

TEMPERATURE, JANUARY TO JULY.

For the period January to July, inclusive, the mean temperature averaged above the normal in the middle Atlantic and New England states, the Lake region, extreme northwest, and over the northern plateau region; elsewhere it was deficient. In the Lake region, the extreme northwest, and over the northern plateau the excess was about 1. On the northeast and middle-eastern slopes of the Rocky Mountains and over the middle and southern plateau regions there was a deficiency of about 2, and at Key West, Fla., in the west Gulf states, the Missouri Valley, and on the southeast slope of the Rocky Mountains the deficiency was about 1.

PERIODS OF HIGH TEMPERATURE.

Exceptionally high temperature prevailed in Washington and Oregon from the 22d to the 24th, and this condition extended over California on the 24th, and during the 24th and 25th the temperature was the highest ever reported at a number of stations in the Pacific coast states.

PERIODS OF LOW TEMPERATURE.

From the 7th to 10th exceptionally cool weather prevailed from the Mississippi Valley eastward to the middle Atlantic and North Carolina coasts, the temperature being 2 to 5 lower than previously reported for the season. The morning of the 18th the temperature was 2 to 10 below the mean in all districts lying east of the Rocky Mountains, except Maine. On the 27th the lowest temperature on record for the season was noted in western New York, northwestern Pennsylvania, and northern Ohio, where the temperature was 1 to 4 below the lowest previously reported for the third decade of July.

YEARS OF HIGHEST MEAN TEMPERATURE IN JULY.

The mean temperature for the current month was the highest ever reported for July at Sacramento, Los Angeles, and San Diego, Cal. In the middle Mississippi and Ohio valleys, the lower lake region, Pennsylvania, New York, and New Jersey the highest mean temperature for July occurred in 1887, when the mean was 4 to 5 above the normal, and in the upper lake region in 1878, when the mean was 3 to 5 above the normal.

YEARS OF LOWEST MEAN TEMPERATURE IN JULY.

The current month was the coolest July on record from the Red River of the North Valley and the middle-eastern slope of the Rocky Mountains eastward to the Atlantic coast north of

the 35th parallel, and at Salt Lake City, Utah. In North Dakota and Montana the lowest mean temperature for July occurred in 1884, when the mean was 4 to 6 below the normal.

DEVIATIONS FROM NORMAL TEMPERATURE.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for July for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for July, 1891; (4) the departure of the current month from the normal; (5) and the extreme monthly mean for July, during the period of observation and the years of occurrence:

| State and station. | County. | (1) Normal for the month of July. | (2) Length of record. | (3) Mean for July, 1891. | (4) Departure from normal. | (5) Extreme monthly mean for July. | | |
|--------------------|----------------|-----------------------------------|-----------------------|--------------------------|----------------------------|------------------------------------|-----------|---------|
| | | | | | | Highest. | Year. | Lowest. |
| Arkansas. | | | | | | | | |
| Lead Hill | Boone | 81.7 | 9 | 77.7 | - 4.0 | 84.2 | 1888 | 75.2 |
| California. | | | | | | | | |
| Sacramento | Sacramento | 72.9 | 38 | 70.6 | - 2.3 | 80.6 | 1854 | 68.3 |
| Connecticut. | | | | | | | | |
| Middletown | Middlesex | 70.9 | 23 | 67.0 | - 3.9 | 75.4 | 1886 | 66.9 |
| Florida. | | | | | | | | |
| Merritts Island | Brevard | 80.5 | 9 | 82.8 | + 2.3 | 88.8 | 1891 | 78.5 |
| Georgia. | | | | | | | | |
| Forsyth | Monroe | 82.1 | 17 | 79.3 | - 2.8 | 85.7 | 1881 | 78.3 |
| Illinois. | | | | | | | | |
| Peoria | Peoria | 78.3 | 35 | 72.7 | - 5.6 | 83.2 | 1887 | 71.2 |
| Riley | McHenry | 71.5 | 35 | 65.4 | - 5.1 | 80.2 | 1868 | 65.4 |
| Indiana. | | | | | | | | |
| Vevay | Switzerland | 77.6 | 25 | 72.2 | - 5.4 | 84.3 | 1868 | 72.2 |
| Iowa. | | | | | | | | |
| Cresco | Howard | 71.2 | 18 | 65.1 | - 6.1 | 75.2 | 1874 | 65.1 |
| Monticello | Jones | 73.0 | 37 | 68.4 | - 4.6 | 79.3 | 1868 | 63.2 |
| Logan | Harrison | 75.6 | 17 | 71.7 | - 3.9 | 79.5 | 1881 | 69.8 |
| Kansas. | | | | | | | | |
| Lawrence | Douglas | 78.4 | 29 | 72.0 | - 6.4 | 85.1 | 1868 | 72.0 |
| Wellington | Sumner | 78.7 | 12 | 75.1 | - 3.6 | 83.9 | 1879 | 73.0 |
| Louisiana. | | | | | | | | |
| Grand Coteau | Saint Landry | 83.5 | 7 | ..... | ..... | 85.4 | 1884 | 81.4 |
| Maine. | | | | | | | | |
| Orono | Pepobscot | 67.0 | 21 | 65.3 | - 1.7 | 71.0 | 1887 | 64.2 |
| Maryland. | | | | | | | | |
| Cumberland | Allegany | 72.2 | 31 | 68.7 | - 3.5 | 77.7 | 1887 | 67.4 |
| Massachusetts. | | | | | | | | |
| Amherst | Hampshire | 70.8 | 55 | 66.5 | - 4.3 | 76.1 | 1887 | 66.4 |
| Newburyport | Esex | 69.1 | 13 | 67.1 | - 2.0 | 71.1 | 1882 | 67.1 |
| Somerset | Bristol | 74.0 | 19 | 71.1 | - 2.9 | 77.9 | 1876 | 71.1 |
| Michigan. | | | | | | | | |
| Kalamazoo | Kalamazoo | 73.6 | 14 | 67.2 | - 5.4 | 77.8 | 1885 | 67.2 |
| Thornville | Lapeer | 71.8 | 14 | 67.4 | - 4.4 | 76.2 | 1887 | 67.4 |
| Minnesota. | | | | | | | | |
| Minneapolis | Hennepin | 71.2 | 26 | 66.1 | - 5.1 | 77.2 | 1866 | 65.8 |
| Montana. | | | | | | | | |
| Fort Shaw | Lewis & Clarke | 68.5 | 22 | 64.2 | - 4.3 | 74.1 | 1886 | 61.5 |
| New Hampshire. | | | | | | | | |
| Hanover | Grafton | 69.4 | 48 | 66.7 | - 2.7 | 73.4 | 1870 | 62.3 |
| New Jersey. | | | | | | | | |
| Moorestown | Burlington | 75.1 | 28 | 69.6 | - 5.5 | 78.8 | 1863 | 69.6 |
| South Orange | Esex | 73.0 | 20 | 68.2 | - 4.8 | 77.8 | 1870 | 68.2 |
| New York. | | | | | | | | |
| Cooperstown | Otsego | 68.4 | 37 | 63.3 | - 5.1 | 73.4 | 1854, '70 | 62.7 |
| Palermo | Owego | 69.3 | 37 | 65.0 | - 4.5 | 76.6 | 1864 | 62.3 |
| North Carolina. | | | | | | | | |
| Lenoir | Caldwell | 74.7 | 18 | 71.3 | - 3.4 | 77.7 | 1877 | 66.4 |
| Ohio. | | | | | | | | |
| N'th Lewisburgh. | Champaign | 73.5 | 59 | 71.7 | - 1.8 | 81.0 | 1887 | 68.0 |
| Wauseon | Fulton | 72.7 | 21 | 68.4 | - 4.3 | 77.1 | 1887 | 67.7 |
| Oregon. | | | | | | | | |
| Albany | Linn | 66.3 | 13 | 63.6 | - 0.6 | 69.9 | 1889 | 63.2 |
| Eols. | Polk | 64.6 | 21 | 64.1 | - 0.5 | 70.3 | 1889 | 59.6 |
| Pennsylvania. | | | | | | | | |
| Duberry | Wayne | 68.1 | 23 | 63.0 | - 5.1 | 72.6 | 1887 | 63.0 |
| Grampian Hills. | Clearfield | 70.7 | 27 | 65.4 | - 5.3 | 76.8 | 1887 | 65.4 |
| Wellsborough | Tioga | 70.1 | 12 | 60.4 | - 9.7 | 76.1 | 1881 | 60.4 |
| South Carolina. | | | | | | | | |
| Statesburgh. | Sumter | 76.7 | 10 | 74.6 | - 4.1 | 84.0 | 1881 | 74.6 |
| Tennessee. | | | | | | | | |
| Austin | Wilson | 79.6 | 23 | 76.3 | - 3.3 | 85.2 | 1879 | 71.6 |
| Texas. | | | | | | | | |
| New Ulm | Austin | 82.7 | 19 | 82.4 | - 0.3 | 85.0 | 1879 | 80.6 |
| Vermont. | | | | | | | | |
| Strafford | Orange | 69.4 | 18 | 65.7 | - 3.7 | 73.5 | 1887 | 65.7 |
| Virginia. | | | | | | | | |
| Birdsneck | Northhampt'n | 75.8 | 23 | 74.6 | - 4.2 | 84.0 | 1887 | 74.3 |
| Washington. | | | | | | | | |
| Port Townsend | Jefferson | 61.7 | 17 | 59.7 | - 2.0 | 66.1 | 1875 | 58.7 |
| Wisconsin. | | | | | | | | |
| Madison | Dane | 72.0 | 22 | 66.6 | - 5.4 | 75.8 | 1859 | 66.6 |

* Occurred in 1882 also.

MAXIMUM TEMPERATURE.

The highest temperature ever reported by a regular station of the Weather Bureau in July was 118, at Yuma, Ariz., in 1878,

and by a voluntary observer, 128, at Mammoth Tank, in the Colorado Desert, Cal., in 1887.

In July, 1891, the temperature was the highest ever reported for July at stations in the interior of the Pacific coast states south of the Columbia River, and at El Paso and San Antonio, Tex.

For the current month the temperature rose above 120 in the Colorado Desert, and at Furnace Creek, Death Valley, Cal.; it was above 110 in the Sacramento, San Joaquin, and lower Colorado valleys; and was above 100 at stations in the interior of the Pacific coast states south of the Columbia River, and over a greater part of Texas. The reports of voluntary observers show maximum temperature above 100 in west-central Maine, in parts of the Gulf States, southern Illinois, and at several stations in the Missouri Valley and Rocky Mountain and plateau regions. The lowest maximum temperature was 66, at Eureka, Cal., and the maximum values were below 80 on the north Washington and north California coasts, at points on the extreme east and southeast New England coasts, and at Atlantic City, N. J.

MINIMUM TEMPERATURE.

The temperature was generally the lowest ever reported for July in districts lying east of the 100th meridian, and at Salt Lake City, Utah, and Walla Walla, Wash.

The lowest temperature reported by a regular station of the Weather Bureau was 37, at Saint Vincent, Minn. The temperature fell below 45 north of a line traced from Maine westward over the south part of the Lake region, thence northwest to northeastern Minnesota, thence southwest to central New Mexico and central Arizona, thence northwest to extreme west-central Nevada, thence northward to northeast Oregon, and thence northwest to extreme northwestern Washington. The reports of voluntary observers show temperature falling to or below 32 at points in the middle Rocky Mountain region, the lowest reading reported being 10, at Breckenridge, Colo. The highest minimum temperature reported was 72, at Brownsville, Tex., and Furnace Creek, Death Valley, Cal., and the minimum temperature was 70 in extreme southern Texas, and in south Florida.

RANGES OF TEMPERATURE.

The greatest daily range of temperature is given in the table of miscellaneous data. The greatest monthly ranges of temperature were noted over the northern and middle plateau regions and in the interior of the Pacific coast states, where they were more than 55, whence they decreased to less than 40 on the north Pacific coast, to 20 at Eureka, Cal., to 31 at San Francisco, Cal., and to 30 at San Diego, Cal. East of the Rocky Mountain regions the monthly ranges decreased to less than 30 on the southeast New England and New Jersey coasts, to 19 at Hatteras, N. C., to 20 over south Florida, and to less than 30 along the immediate Gulf coast.

FROST.

Frost injurious to vegetation was reported as follows: at Happy Valley, Oregon, on the 6th; in the country about Sault de Ste. Marie, Mich., and in Green Lake Co., Wis., on the 8th; at Ball Mountain and Marshall, Mich., on the 19th; light frost in the upper, and the northern portion of the lower, peninsula of Michigan, on the 20th; at Elkton, S. Dak., on the 24th; at Marshall, Mich., on the 25th; at Corry, Pa., Hudson and Marshall, Mich., on the 27th; at Barkhempstead, Conn., on the 28th; and at points in northern lower Michigan on the 30th and 31st.

The killing frost of the last two days of the month in Michigan was more than two months late, and that of the 28th in Connecticut was more than three months late, when compared with the average date of last killing frost in the respective localities.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for July, 1891, as determined from the reports of nearly 2,000 stations, is exhibited on Chart III. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for regular stations of the Weather Bureau. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The greatest monthly precipitation occurred in areas in the middle and south Atlantic and Gulf states, Florida, Arkansas, south Kansas, and east Nebraska, where it was more than 8.00, and at stations in those districts it exceeded 10.00. Over the greater part of California south of the Sacramento Valley, at stations in west-central Nevada, and along the Rio Grande River in south-central Texas no precipitation was reported. The monthly precipitation was generally less than 1.00 along the Pacific coast, over the greater part of the middle plateau region, and from the southern part of the southern plateau region over south Texas to the 95th meridian. The monthly precipitation was also less than 1.00 in central South Dakota, the northern and southern parts of lower Michigan, and at Key West, Fla.

DEPARTURES FROM NORMAL PRECIPITATION.

The monthly precipitation was in excess of the normal in the Atlantic coast and Gulf states, except on the south New England coast, in southern North Carolina, Florida, and along the immediate east Gulf coast. It was also in excess along the eastern slope of the Rocky Mountains, over the northern and the west parts of the middle plateau region, and on the middle Pacific coast. In districts other than those named the monthly precipitation was generally deficient. The greatest excess was noted in Arkansas, where it exceeded 4.00, and the most marked deficiency occurred over the east part of the southern plateau region, where it was more than 2.00.

Considered by districts, the precipitation averaged more than double the usual amount over the plateau region; it was about one-half greater than usual over the middle plateau; one-fourth to one-half greater in the middle Atlantic and west Gulf states; and one-tenth to two-tenths greater in the south Atlantic states, the Ohio Valley and Tennessee, the extreme northwest, and on the eastern slope of the Rocky Mountains. At Key West, Fla., the monthly precipitation was about one-fifth of the usual amount; over the southern plateau region about one-fourth; on the north Pacific coast about one-half; and in New England and the upper Mississippi and Missouri valleys about four-fifths. In the east Gulf states, the Lake region, and along the middle and south Pacific coasts the monthly precipitation averaged about normal.

YEARS OF GREATEST PRECIPITATION IN JULY.

At Atlantic City, N. J., Fort Smith and Little Rock, Ark., Fort Sill, Okla. T., Wellington, Kans., Fort Shaw, Mont., Walla Walla, Wash., and Red Bluff, Cal., the precipitation for the current month was the greatest ever reported for July. In the middle Mississippi and the middle and lower Ohio valleys the greatest precipitation noted for July occurred in 1875, when it was 5.00 to 12.00 above the normal.

YEARS OF LEAST PRECIPITATION IN JULY.

At Key West, Fla., El Paso, Tex., and Fort Stanton and Santa Fé, N. Mex., the precipitation for the current month was the least ever reported for July. On the middle and south Pacific coasts, where no rainfall was reported for the current month, an almost entire absence of precipitation is not uncommon in July.

PRECIPITATION JANUARY TO JULY.

For the period January to July the precipitation averaged nearly normal in New England, the Gulf States, the Missouri

and Rio Grande valleys, the Ohio Valley and Tennessee, on the southeast slope of the Rocky Mountains, over the southern and northern plateau regions, and along the Pacific coast. On the northeast and middle-eastern slopes of the Rocky Mountains the precipitation was one-fourth to one-half greater, and on the middle Atlantic coast, in the extreme northwest, and over the middle plateau region one-tenth to two-tenths greater than usual. At Key West, Fla., the precipitation was about one-half, and in the south Atlantic states, the upper Mississippi valley, and the Lake region it was about eight-tenths of the usual amount for the period named.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for July for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for July, 1891; (4) the departure of the current month from the average; (5) and the extremes for July during the period of observation and the years of occurrence:

| State and station. | County. | | | | | (5) Extremes for July. | | | |
|--------------------|----------------------|------------------------------------|-----------------------|---------------------------|-----------------------------|------------------------|-------|--------------|----------|
| | | (1) Average for the month of July. | (2) Length of record. | (3) Total for July, 1891. | (4) Departure from average. | Greatest. | | Least. | |
| | | | | | | Am't. | Year. | Am't. | Year. |
| Arkansas. | | | | | | | | | |
| Lead Hill | Boone | Inches. 5.21 | Years 9 | Inches. 2.10 | Inches. -3.11 | Inches. 11.60 | 1883 | Inches. 1.15 | 1888 |
| California. | Sacramento | 0.02 | 41 | trace. | -0.02 | 0.55 | 1860 | 0.00 | * |
| Connecticut. | Middletown | 4.51 | 29 | 4.98 | +0.47 | 13.43 | 1889 | 1.54 | 1870 |
| Florida. | Merrits Island | 6.28 | 13 | 3.15 | -3.13 | 11.72 | 1884 | 0.86 | 1883 |
| Georgia. | Brevard | 4.56 | 17 | 5.44 | +0.88 | 12.70 | 1887 | 0.32 | 1878 |
| Illinois. | Forsyth | 3.97 | 35 | 2.82 | -1.15 | 8.87 | 1860 | 0.47 | 1896 |
| Indiana. | Peoria | 3.77 | 40 | 2.40 | -1.37 | 9.99 | 1862 | 0.53 | 1890 |
| Iowa. | Logansport | 3.19 | 16 | 1.60 | -1.59 | 7.52 | 1889 | 0.62 | 1856 |
| Kansas. | Vevey | 4.13 | 26 | 2.99 | -1.14 | 9.80 | 1874 | 0.90 | 1869 |
| Louisiana. | Cresco | 4.33 | 18 | 4.15 | -0.18 | 12.70 | 1883 | 1.32 | 1890 |
| Maine. | Monticello | 4.33 | 36 | 4.55 | +0.22 | 10.93 | 1883 | 0.60 | 1874 |
| Maryland. | Logan | 5.36 | 25 | 6.16 | +0.80 | 13.00 | 1878 | 2.20 | 1886 |
| Massachusetts. | Lawrence | 4.34 | 26 | 6.40 | +2.06 | 7.85 | 1861 | 0.11 | 1886 |
| Michigan. | Wellington | 4.04 | 12 | 10.06 | +6.02 | 10.06 | 1891 | 0.46 | 1890 |
| Minnesota. | Grand Coteau | 5.57 | 8 | ..... | ..... | 12.36 | 1889 | 1.89 | 1888 |
| Mississippi. | Harrison | 3.46 | 21 | 3.56 | +0.10 | 7.11 | 1887 | 1.05 | 1886 |
| Missouri. | Penobscot | 3.55 | 19 | 5.17 | +1.62 | 5.59 | 1887 | 1.01 | 1885 |
| Montana. | Allegany | 4.56 | 55 | 4.79 | +0.23 | 11.58 | 1874 | 0.96 | 1864 |
| Montgomery. | Hampshire | 3.89 | 13 | 3.07 | -0.22 | 6.90 | 1883 | 1.43 | 1882 |
| Nebraska. | Newburyport | 3.85 | 19 | 2.24 | -1.61 | 7.52 | 1880 | 2.04 | 1886 |
| North Carolina. | Kalamazoo | 3.47 | 15 | 3.81 | +0.34 | 6.50 | 1877 | 0.79 | 1887 |
| Ohio. | Thornville | 3.01 | 14 | 4.26 | +1.25 | 6.69 | 1883 | 0.47 | 1881 |
| Oregon. | Lapeer | 3.03 | 25 | 2.80 | -0.23 | 6.26 | 1879 | 0.43 | 1877 |
| Pennsylvania. | Hennepin | 4.02 | 21 | 3.40 | +2.38 | 3.40 | 1891 | 0.00 | '71, '74 |
| Rhode Island. | Lewis Clarke | 3.48 | 45 | 4.34 | +0.86 | 8.48 | 1877 | 1.24 | 1854 |
| South Carolina. | Grafton | 4.31 | 28 | 4.61 | +0.30 | 7.94 | 1889 | 1.40 | 1882 |
| Tennessee. | Burlington | 5.35 | 20 | 6.00 | +0.65 | 18.58 | 1889 | 1.03 | 1881 |
| Texas. | Esex | 4.16 | 37 | 5.02 | +0.86 | 7.92 | 1863 | 0.89 | 1868 |
| Utah. | Otsego | 3.28 | 37 | 4.83 | +1.55 | 6.60 | 1874 | 0.64 | 1882 |
| Vermont. | Palermo | 6.47 | 13 | 3.43 | -3.04 | 12.30 | 1880 | 2.65 | 1890 |
| Virginia. | Lenoir | 4.62 | 18 | 7.30 | +2.68 | 9.10 | 1886 | 1.70 | 1884 |
| Washington. | Caldwell | 4.71 | 19 | 4.05 | -0.66 | 8.60 | 1876 | 0.30 | 1890 |
| West Virginia. | Champaign | 3.68 | 19 | 2.36 | -1.32 | 7.26 | 1872 | 0.31 | 1886 |
| Wisconsin. | Fulton | 0.54 | 14 | 0.21 | -0.33 | 1.87 | 1884 | 0.00 | * |
| Wyoming. | Polk | 0.46 | 19 | 0.19 | -0.27 | 2.29 | 1884 | 0.00 | * |
| X. | Dyberry | 4.80 | 20 | 3.88 | -0.92 | 9.28 | 1887 | 0.00 | 1868 |
| Y. | Grampian Hills | 5.02 | 20 | 7.03 | +2.01 | 7.33 | 1889 | 3.24 | 1890 |
| Z. | Weisborough | 6.47 | 13 | 3.43 | -3.04 | 12.30 | 1880 | 2.65 | 1890 |
| Alabama. | Tioga | 4.37 | 10 | 7.25 | +2.88 | 8.34 | 1890 | 1.70 | 1884 |
| Arkansas. | Statesburgh | 4.02 | 25 | 4.53 | +0.50 | 10.13 | 1880 | 0.30 | 1881 |
| Arkansas. | Austin | 3.83 | 19 | 1.26 | -2.57 | 14.38 | 1873 | 0.00 | 1884 |

Deviations from average precipitation—Continued.

| State and station. | County. | (1) Average for the month of July. | (2) Length of record. | (3) Total for July, Regd. | (4) Departure from average. | (5) Extremes for July. | | | |
|--------------------|-------------|------------------------------------|-----------------------|---------------------------|-----------------------------|------------------------|-------|-------------|-------|
| | | | | | | Greatest. | | Least. | |
| | | | | | | Am't. | Year. | Am't. | Year. |
| Vermont. | | | | | | | | | |
| Stratford. | Orange | Inches 4.59 | Years 18 | Inches 3.85 | -0.74 | Inches 6.77 | 1873 | Inches 2.00 | 1881 |
| Virginia. | | | | | | | | | |
| Birds Nest. | Northampton | 4.24 | 22 | 7.05 | +2.81 | 8.90 | 1877 | 1.25 | 1873 |
| Washington. | | | | | | | | | |
| Fort Townsend. | Jefferson | 0.85 | 16 | 0.38 | -0.47 | 4.41 | 1888 | 0.01 | 1889 |
| Wisconsin. | | | | | | | | | |
| Madison. | Dane | 4.32 | 22 | 2.64 | -1.68 | 9.47 | 1881 | 0.79 | 1886 |

*Generally.

EXCESSIVE PRECIPITATION.

The following tables show, by states, the number of stations reporting monthly precipitation to equal or exceed 10.00; precipitation to equal or exceed 2.50 in 24 hours; and precipitation to equal or exceed 1.00 in 1 hour:

Monthly precipitation to exceed 10.00.

| State. | Number of stations. | State. | Number of stations. |
|--------------|---------------------|----------------|---------------------|
| Louisiana | 15 | North Carolina | 3 |
| Mississippi | 7 | Alabama | 1 |
| Pennsylvania | 3 | Nebraska | 1 |
| Maryland | 4 | South Carolina | 1 |
| Arkansas | 3 | Texas | 1 |
| Florida | 3 | Georgia | 1 |
| Kansas | 3 | | |

Precipitation to equal or exceed 2.50 in 24 hours.

| State. | Number of stations. | Dates. | State. | Number of stations. | Dates. |
|----------------|---------------------|---|----------------|---------------------|--------------------------|
| Louisiana | 25 | 4-5, 5-6, 5-7, 7-8, 8-9, 15-16, 26. | Maryland | 5 | 1-2, 2, 8, 18, 23-24. |
| Mississippi | 13 | 6, 8-9, 18, 25- 27, 27-28, 29, 29-30, 30, 30-31. | New York | 5 | 18, 24, 30, |
| Iowa | 12 | 6, 6-7, 10-11, 20-21, 21, 21-22, 22, | Pennsylvania | 4 | 2-3, 18, 23- |
| Tennessee | 10 | 23, 28-29, 29, 31. | Colorado | 4 | 14-15, 30, |
| Arkansas | 9 | 27, 27-28, 28- 29, 29, 30, 31. | Georgia | 4 | 25-26, 26, 29- 30. |
| Kansas | 7 | 4, 5-6, 7-14, 15, 22-23, 26. | North Carolina | 3 | 17-18, 18-20, 19. |
| Ohio | 7 | 7-8. | Alabama | 3 | 7-8, 29, 30, 31. |
| South Carolina | 6 | 1, 18, 19-20, 20, 26, 28. | Florida | 3 | 6, 12-13, 21. |
| Texas | 6 | 4, 4-6, 5, 16, 17, 24, 25. | Nebraska | 3 | 6-7, 13, 18-19. |
| North Dakota | 5 | 11-13, 12, 20- 21. | Kentucky | 2 | 7-8. |

Precipitation to equal or exceed 1.00 in 1 hour.

| State. | Number of stations. | Dates. | State. | Number of stations. | Dates. |
|----------------|---------------------|---|----------------|---------------------|--------------|
| Kansas | 11 | 3, 4, 6, 14-15, 20, 22, 26, 27, 28, 31. | Texas | 3 | 19, 25, 30. |
| Georgia | 9 | 15, 17, 18, 20, 21, 23, 25, 26, 28. | Virginia | 3 | 17, 20. |
| Iowa | 9 | 6, 10, 16, 21, 22. | Wisconsin | 3 | 17, 21, 28. |
| Florida | 6 | 1, 6, 11, 12, 14, 19, 21, 23. | Illinois | 3 | 6-7, 13, 17. |
| South Dakota | 5 | 3, 5, 16, 19, 17, 25, 28, 31. | Louisiana | 3 | 16, 17, 26. |
| Arkansas | 5 | 6, 21, 24, 26, 28. | North Dakota | 2 | 12, 21. |
| Colorado | 5 | 7, 17, 20, 22, 23. | New York | 2 | 15, 18. |
| Missouri | 5 | 3, 4, 6, 15-17, 18, 20, 22. | Alabama | 3 | 6, 31. |
| Mississippi | 4 | 3, 8, 15, 27. | Arizona | 2 | 16, 26. |
| Nebraska | 4 | 13, 19, 24, 31. | Indiana | 3 | 23, 29. |
| Pennsylvania | 3 | 19, 23, 24. | Minnesota | 3 | 12, 16. |
| South Carolina | 3 | 1, 18, 19. | New Mexico | 3 | 13, 22. |
| Tennessee | 3 | 17, 22, 29. | North Carolina | 1 | 20. |

The following tables show the number of years for which monthly precipitation to equal or exceed 10.00 inches, daily precipitation to equal or exceed 2.50 inches, and hourly precipitation to equal or exceed 1.00 inch has been reported in the several states and territories for July during the last 22 years:
Excessive monthly precipitation.

| State. | No. years noted. | State. | No. years noted. |
|----------------|------------------|----------------------|------------------|
| Florida | 16 | Texas | 4 |
| North Carolina | 12 | Mississippi | 4 |
| Georgia | 11 | Illinois | 3 |
| New Hampshire | 11 | New Jersey | 3 |
| Alabama | 9 | Wisconsin | 3 |
| South Carolina | 9 | Arkansas | 3 |
| Iowa | 8 | Maryland | 3 |
| Louisiana | 7 | The Dakotas | 2 |
| Missouri | 7 | Minnesota | 2 |
| Ohio | 6 | West Virginia | 2 |
| Nebraska | 6 | Colorado | 1 |
| Pennsylvania | 6 | Connecticut | 1 |
| New York | 5 | Delaware | 1 |
| Massachusetts | 4 | District of Columbia | 1 |
| Michigan | 4 | Indian Territory | 1 |
| Tennessee | 4 | Kentucky | 1 |

Excessive daily precipitation.

| State. | No. years noted. | State. | No. years noted. |
|----------------|------------------|----------------------|------------------|
| Kansas | 18 | Tennessee | 9 |
| Iowa | 17 | Minnesota | 7 |
| Indiana | 16 | Michigan | 6 |
| North Carolina | 15 | Connecticut | 6 |
| Georgia | 14 | Kentucky | 6 |
| Nebraska | 14 | New Hampshire | 6 |
| Pennsylvania | 14 | New Jersey | 6 |
| South Carolina | 13 | Virginia | 6 |
| Florida | 13 | District of Columbia | 4 |
| Texas | 13 | West Virginia | 4 |
| The Dakotas | 12 | Indian Territory | 3 |
| Illinois | 11 | Montana | 3 |
| Louisiana | 11 | Rhode Island | 3 |
| Ohio | 11 | Arkansas | 3 |
| Alabama | 10 | Arizona | 3 |
| Massachusetts | 9 | Delaware | 2 |
| Wisconsin | 9 | Maine | 2 |
| Mississippi | 9 | Colorado | 2 |
| Missouri | 9 | New Mexico | 2 |
| New York | 9 | Oregon | 2 |
| | | Vermont | 1 |

Excessive hourly precipitation.

| State. | No. years noted. | State. | No. years noted. |
|----------------|------------------|----------------------|------------------|
| Iowa | 16 | Minnesota | 7 |
| Pennsylvania | 15 | Massachusetts | 5 |
| Kansas | 14 | Mississippi | 5 |
| North Carolina | 14 | Maryland | 4 |
| Illinois | 13 | Wyoming | 4 |
| Alabama | 12 | Colorado | 4 |
| Florida | 12 | Kentucky | 4 |
| Indiana | 12 | New Mexico | 4 |
| Michigan | 12 | West Virginia | 4 |
| Nebraska | 12 | Wisconsin | 4 |
| The Dakotas | 10 | District of Columbia | 2 |
| Georgia | 10 | Maine | 2 |
| New York | 10 | New Jersey | 2 |
| Texas | 10 | Indian Territory | 2 |
| Virginia | 9 | Missouri | 2 |
| Ohio | 8 | California | 1 |
| Louisiana | 8 | Connecticut | 1 |
| South Carolina | 8 | Montana | 1 |
| Tennessee | 8 | New Hampshire | 1 |
| Arizona | 7 | Utah | 1 |
| Arkansas | 7 | Nevada | 1 |

The following tables give exceptionally heavy monthly, daily, and hourly rainfalls reported for July during the last 22 years:

Monthly.

| Station and state. | Am't. | Year. | Station and state. | Am't. | Year. |
|-------------------------|---------------|------------|--------------------|---------------|------------|
| White, Tenn. | Inches. 28.11 | Year. 1883 | Wilmington, N. C. | Inches. 21.12 | Year. 1886 |
| Mount Washington, N. H. | 23.90 | 1884 | Auburn, Ala. | 21.09 | 1887 |
| Lake Hook, Minn. | 21.86 | 1872 | | | |

Daily (24 hours).

| Station and state. | Amount. | Date. | Station and state. | Amount. | Date. |
|----------------------|---------|-------------|--------------------------|---------|-------------|
| Inches. | | | Inches. | | |
| Union Point, Ga. | 10.00 | 29, 1890 | Cheboygan, Mich. | 6.34 | 7-8, 1890 |
| South Orange, N. J. | 8.57 | 30-31, 1890 | Greenville, Miss. | 6.21 | 27-28, 1890 |
| Fort Barrancas, Fla. | 8.26 | 22-23, 1890 | Grand Junction, Tenn. | 6.10 | 13-14, 1890 |
| Logan, Iowa | 8.00 | 10, 1890 | Charleston, S. C. | 6.07 | 27-28, 1890 |
| Plaquemine, La. | 7.75 | 5, 1891 | De Land, Fla. | 6.05 | 12-13, 1891 |
| Wilmington, N. C. | 7.33 | 15, 1890 | Russellville, Ark. | 6.00 | 29, 1890 |
| Independence, Mo. | 7.61 | 14, 1890 | Manhattan, Kans. | 5.38 | 23, 1890 |
| Hulmeville, Pa. | 7.00 | 26, 1890 | Rock Island Ar's'l, Ill. | 5.16 | 13, 1890 |
| Marengo, Ind. | 7.00 | 23, 1890 | Fort Clark, Tex. | 5.00 | 10, 1890 |

One hour and less.

| Station and state. | Amount. | Time. | Date. |
|---------------------------|---------|-------|----------|
| Inches. | h. m. | | |
| Savannah, Ga. | 0.47 | 0 05 | 16, 1891 |
| Jupiter, Fla. | 0.45 | 0 05 | 21, 1891 |
| Do | 0.43 | 0 05 | 21, 1890 |
| Boston, Mass. | 0.40 | 0 05 | 4, 1891 |
| Chicago, Ill. | 0.40 | 0 05 | 14, 1890 |
| Dodge City, Kans. | 0.40 | 0 05 | 6, 1891 |
| Savannah, Ga. | 0.40 | 0 05 | 8, 1890 |
| Washington, D. C. | 0.40 | 0 05 | 15, 1891 |
| Huron, S. Dak. | 0.30 | 0 05 | 2, 1890 |
| Albany, N. Y. | 1.30 | 0 10 | 26, 1886 |
| Savannah, Ga. | 1.22 | 0 10 | 10, 1890 |
| Dubuque, Iowa | 0.92 | 0 10 | 18, 1891 |
| Norfolk, Va. | 0.67 | 0 10 | 2, 1890 |
| New York, N. Y. | 0.50 | 0 10 | 18, 1890 |
| Sandusky, Ohio | 0.50 | 0 10 | 27, 1886 |
| Amana, Iowa | 2.25 | 0 15 | 11, 1879 |
| New Orleans, La. | 1.56 | 0 15 | 31, 1878 |
| Philo, Ill. | 1.40 | 0 15 | 6, 1889 |
| New York, N. Y. | 1.20 | 0 15 | 7, 1890 |
| New Market, Ala. | 1.00 | 0 15 | 13, 1880 |
| Rancocas, N. J. | 1.08 | 0 15 | 12, 1891 |
| Amherst, Mass. | 1.00 | 0 15 | 17, 1890 |
| West Leavenworth, Kans. | 2.00 | 0 20 | 16, 1879 |
| Logansport, Ind. | 1.90 | 0 20 | 21, 1887 |
| Wilkes-Barre, Pa. | 3.50 | 0 30 | 7, 1879 |
| Benton Harbor, Mich. | 2.50 | 0 30 | 15, 1890 |
| Jacksonville, Fla. | 2.01 | 0 30 | 14, 1890 |
| Springer, N. Mex. | 3.49 | 0 40 | 6, 1886 |
| Lansing, Mich. | 3.85 | 0 50 | 13, 1891 |
| Rock Island Arsenal, Ill. | 3.40 | 1 00 | 21, 1883 |
| Tucson, Ariz. | 5.16 | 1 15 | 13, 1880 |
| | 5.10 | 1 45 | 11, 1878 |

Table of excessive precipitation, July, 1891.

| State and station. | Monthly rainfall 10 inches, or more. | Rainfall 2-50 inches, or more, in 24 hours. | Rainfall of 1 inch, or more, in one hour. |
|-----------------------|---|--|---|
| | Month. | Amt. | Day. |
| | Inches. | Inches. | Inches. |
| Alabama. | | | |
| Camden | | 1.05 | 1 00 |
| Eufaula | | 2.10 | 1 15 |
| Mobile | 10.05 | 6.63 | 29-31 |
| Valley Head | | | |
| Wiggins | | 3.18 | 7, 8 |
| Arizona. | | | |
| Fort Apache | | 1.30 | 0 25 |
| Red Rock | | 1.50 | 1 00 |
| Arkansas. | | | |
| Conway | | 1.00 | 1 00 |
| Dallas | 2.75 | 29 | 1.30 0 30 |
| Fort Smith | 3.55 | 28-29 | 1.00 0 30 |
| Harrisburg | 2.55 | 29 | |
| Helena (1) | 4.00 | 29 | |
| Helena (2) | 4.48 | 29 | |
| Hot Springs | 12.86 | 2.77 | 29 |
| Do | 3.80 | 30 | |
| Little Rock | 3.71 | 27-28 | |
| Lonoke | 11.75 | 3-13 | 2.00 1 00 |
| Stuttgart | 12.11 | 2.77 | 1.45 0 30 |
| Winslow | 5.34 | 27-29 | |
| Colorado. | | | |
| Brandon | 3.10 | 30 | 2.13 2 00 |
| Chivington | 3.04 | 30 | 1.00 1 00 |
| Lavender | 1. | 1.33 | 1 00 26 |
| Minneapolis | 2.50 | 14-15 | |
| San Luis | | 2.04 | 2 00 24 |
| Sheridan Lake | | 1.80 | 0 55 21 |
| Thon | 2.80 | 30 | |
| District of Columbia. | | | |
| Long Bridge | 2.65 | 2 | |
| Florida. | | | |
| Alva | | 1.27 | 0 55 |
| De Land (1) | 14.33 | 3.64 | 6 |
| Do | 6.05 | 12-13 | 4.05 1 55 |
| Do | 2.50 | 21 | |

Table of excessive precipitation—Continued.

| State and station. | Monthly rainfall to inches, or more. | Rainfall 2-50 inches, or more, in 24 hours. | | Rainfall of 1 inch, or more, in one hour. | |
|---------------------------|---|--|-------|---|--------|
| | | Amt. | Day. | Amt. | Day. |
| <i>Florida—Continued.</i> | | | | | |
| Jacksonville | | | | 1.42 | 1 00 |
| Jupiter | | | | 1.50 | 1 00 |
| Do | | 3.40 | 21 | 1.00 | 0 43 |
| Orange City | | 12.01 | 2.84 | 2.30 | 1 00 |
| Do | | | | 1.48 | 1 20 |
| Saint Petersburg | | | | 1.50 | 1 15 |
| Do | | | | 1.35 | 1 00 |
| <i>Georgia.</i> | | | | | |
| Americus | | | | 1.09 | 0 40 |
| Atlanta | | | | 1.54 | 0 30 |
| Augusta | | | | 1.00 | 1 00 |
| Forsyth | | | | 1.25 | 0 45 |
| Fort Gaines | | 10.38 | | 1.80 | 0 45 |
| Do | | | | 2.20 | 0 45 |
| Gainesville | | 4.70 | 25-26 | | |
| Milledgeville | | 4.44 | 29-30 | | |
| Poulan | | 3.50 | 25-26 | | |
| Quitman (2) | | | | 1.90 | 1 00 |
| Savannah | | | | 1.47 | 1 00 |
| Do | | | | 1.30 | 1 00 |
| Toceo | | | | 1.07 | 1 00 |
| Do | | | | | 17 |
| Union Point | | 3.50 | 38 | | |
| <i>Illinois.</i> | | | | | |
| Chicago | | | | 1.20 | 1 00 |
| East Peoria | | 3.30 | 13 | | |
| Peoria (2) | | | | 1.12 | 0 30 |
| Springfield | | | | 1.20 | 0 30 |
| <i>Indiana.</i> | | | | | |
| Angola | | | | 1.00 | 0 30 |
| Delphi | | | | 1.05 | 0 35 |
| Huntingburgh | | 3.25 | 7 | | |
| <i>Indian Territory.</i> | | | | | |
| Eufaula | | | | 2.10 | 1 15 |
| <i>Iowa.</i> | | | | | |
| Alta (1) | | 2.91 | 21-22 | | |
| Bedford | | | | 1.17 | 1 00 |
| Blakeville | | 3.84 | 20-21 | | |
| Cresco | | 2.77 | 6 | | |
| Davenport | | | | 1.60 | 0 45 |
| Dubuque | | | | 1.87 | 0 27 |
| Eagle Grove | | 2.50 | 21 | | |
| Fayette | | | | 1.85 | 0 45 |
| Grundy Centre | | 2.80 | 22 | | |
| Hampton | | 4.79 | 21-22 | | |
| Humboldt | | 2.52 | 21-22 | | |
| Independence | | 2.75 | 21-22 | | |
| Larrabee | | 3.91 | 21-22 | 1.16 | 0 33 |
| McCauley | | 2.52 | 6-7 | | |
| Marshalltown | | | | 1.22 | 1 00 |
| Monticello | | 3.16 | 6-7 | | |
| Murray | | 2.90 | 10-11 | | |
| Muscadine (2) | | | | 1.75 | 0 35 |
| Sioux City | | | | 1.45 | 1 10 |
| Tipton | | | | 2.14 | 2 00 |
| <i>Kansas.</i> | | | | | |
| Dodge City | | | | 1.00 | 0 46 |
| Downs | | | | 1.63 | 0 30 |
| Do | | | | 1.15 | 0 20 |
| Englewood | | | | 1.25 | 0 45 |
| Fremont | | | | 1.02 | 0 45 |
| Do | | | | 1.52 | 0 45 |
| Grinnell | | 2.50 | 26 | | |
| Kellogg | 11.93 | 2.50 | 5 | 1.45 | 0 45 |
| Do | | 3.00 | 14-15 | 3.00 | 14, 15 |
| Larned | | 2.60 | 26 | 2.00 | 2 00 |
| Manhattan (3) | | | | 1.85 | 1 30 |
| Minneapolis | | | | 2.80 | 6-7 |
| Oberlin | | | | 2.30 | 2 10 |
| Stafford | | 10.30 | 2.98 | 1.39 | 1 00 |
| Topeka | | 2.73 | 22-23 | 2.67 | 2 20 |
| Wellington | 10.06 | 3.25 | 4 | 2.35 | 3 00 |
| <i>Kentucky.</i> | | | | | |
| Caddo | | 3.00 | 7-8 | | |
| Newport Barracks | | 2.65 | 7-8 | | |
| Paducah | | | | 1.75 | 1 00 |
| <i>Louisiana.</i> | | | | | |
| Abbeville | | 10.50 | 5.65 | 5 | |
| Alexandria | | | 5.44 | 5-7 | |
| Baton Rouge | | 11.44 | 5.19 | 4-5 | 1.04 |
| Cameron | | | 6.00 | 5 | |
| Cheneyville | | 13.11 | 9.92 | 5-7 | |
| Clinton | | 14.46 | 10.22 | 5-7 | |
| Coushatta (1) | | | 2.55 | 6-7 | |
| Edgar | | 13.31 | 4.46 | 6 | |
| Emilie | | 10.60 | 3.79 | 6-7 | |
| Girard | | | 4.00 | 6-7 | |
| Homer | | | | 2.26 | 3 00 |
| Houma | | 10.58 | 3.30 | 6 | |
| Jeanerette | | 11.91 | 6.78 | 4-5 | |
| La Fayette | | 12.03 | 8.75 | 5-7 | |
| Lake Charles | | | 2.50 | 6 | |
| Liberty Hill | | | 3.00 | 6 | |
| Do | | | 4.00 | 16 | |
| Luling | | 11.25 | 2.85 | 26 | |
| Marksburg | | 14.77 | 7.50 | 7-8 | |
| Melville | | 10.35 | | | |
| Minden | | | 3.05 | 15 | |
| Monroe | | | 3.40 | 7 | |
| New Iberia | | 10.01 | 2.60 | 6 | |

Table of excessive precipitation—Continued.

| State and station. | Monthly rainfall to inches, or more. | Rainfall 2-50 inches, or more, in 24 hours. | | Rainfall of 1 inch, or more, in one hour. | |
|-----------------------------|--------------------------------------|---|-------|---|-------|
| | | Amt. | Day. | Amt. | Time. |
| <i>Louisiana—Continued.</i> | | | | | |
| Pinecourtville | 10-42 | 5.30 | 5-6 | | |
| Plaquemine | 13-50 | 7.75 | 5 | | |
| Shell Beach | | 7.00 | | | |
| Thibodeaux | | 2.58 | | | |
| Winnsborough | | 3.00 | 6 | | |
| <i>Maryland.</i> | | | | | |
| Baltimore | | 2.50 | 8 | | |
| Barren Creek Springs | 12-35 | 2.05 | 23-24 | | |
| Jewell | 12-15 | 4.87 | 2 | | |
| Leonardtown | 10-32 | 3.56 | 1-2 | | |
| Taneytown | 10-40 | 2.98 | 1-2 | | |
| Do. | | 2.83 | 18 | | |
| <i>Michigan.</i> | | | | | |
| Hudson | | | | 1.00 | 0 30 |
| <i>Minnesota.</i> | | | | | |
| Duluth | | | | 1.35 | 1 00 |
| Moorhead | | | | 1.75 | 4 00 |
| Morris | 3-50 | 5-6 | | | |
| <i>Mississippi.</i> | | | | | |
| Batesville | 10-22 | 2.80 | 6 | | |
| Brookhaven | | 2.72 | 18 | | |
| Columbus (1) | 13-42 | 5.50 | 30-31 | | |
| Do. | | 4.25 | 30 | | |
| Columbus (2) | 14-71 | 2.72 | 29 | | |
| Corinth | | 2.72 | 29 | | |
| Enterprise | 10-69 | 5.30 | 26-27 | | |
| Fayette | | 3.52 | 6 | | |
| Greenville | 12-32 | 6.21 | 27-28 | | |
| Hattiesburg | | 3.12 | 6 | | |
| Haslehurst | | 3.03 | 6 | | |
| Hernando | | 3.30 | 29-30 | | |
| Holly Springs (1) | | 3.51 | 29 | | |
| Holly Springs (2) | | 3.23 | 29 | | |
| Mayersville | | | | 1.70 | 1 30 |
| Meridian | 10-13 | 3.49 | 8-9 | 0.53 | 0 30 |
| Natchez | | 2.70 | | | |
| Rienzi | 3-81 | 29 | 1-04 | 0 30 | 3 |
| Vaden | 10-05 | | | | |
| Waynesborough (2) | | | | 1.86 | 0 40 |
| <i>Missouri.</i> | | | | | |
| Dadeville | | | | 1.90 | 1 20 |
| Excelsior Springs | | | | 1.55 | 1 30 |
| Fayette | | | | 1.40 | 0 30 |
| Lamonte (1) | 3-88 | 7 | | | 7 |
| Saint Charles (1) | 3-50 | 17 | 3-50 | 2 00 | 17 |
| Springfield | | | | 1.00 | 0 50 |
| <i>Montana.</i> | | | | | |
| Fort Assiniboine | | 2.83 | 11-12 | | |
| <i>Nebraska.</i> | | | | | |
| Auburn (1) | 10-41 | 4.04 | 6-7 | | |
| Fairbury | | | | 1.75 | 0 30 |
| Long Pine | | | | 1.00 | 0 30 |
| North Platte | | | | 1.00 | 1 00 |
| Palmer | | 4.00 | 18-19 | | |
| Wilcox | | 2.90 | 13 | 2.90 | 1 40 |
| <i>Nevada.</i> | | | | | |
| Genoa | | | | 1.00 | 1 00 |
| <i>New Hampshire.</i> | | | | | |
| Belmont | | 2.64 | 15 | | |
| North Conway | | 2.65 | 19 | | |
| <i>New Jersey.</i> | | | | | |
| Oceanic | | 2.61 | 30 | | |
| South Orange | | | | 1.25 | 1 00 |
| Springer | | 4.60 | 13-14 | 3.85 | 0 50 |
| Do. | | | | 1.05 | 0 45 |
| <i>New York.</i> | | | | | |
| Brentwood | | 3.50 | 18 | | |
| Hammondport | | 3.30 | 10 | | |
| Lowville | | 2.75 | 24 | | |
| Minnewaska | | | | 2.10 | 2 30 |
| Setauket | | 3.21 | 18 | 3.00 | 3 00 |
| Watertown | | 3.65 | 24 | | |
| <i>North Carolina.</i> | | | | | |
| Currituck Inlet | | 6.33 | 19-20 | | |
| Oak Ridge | 10-99 | 4.20 | 17-18 | | |
| Raleigh | 10-99 | | | 1.79 | 1 25 |
| Smithfield | | 2.50 | 19 | | |
| Willetton | 10-60 | | | | |
| <i>North Dakota.</i> | | | | | |
| Davenport | | 3.10 | 20-21 | | |
| Grand Rapids | | 2.70 | 12 | 2.60 | 2 30 |
| Napoleon | | 3.03 | 11-12 | | |
| Wild Rice | | 2.50 | 12 | 2.50 | 1 45 |
| Do. | | 2.90 | 20-21 | 2.51 | 1 50 |
| <i>Ohio.</i> | | | | | |
| Clarksville | | 2.57 | 7-8 | | |
| Demos | | 3.32 | 7-8 | | |
| Granville | | 3.04 | 7-8 | | |
| Greenfield | | 3.50 | 7 | | |
| Georgetown | | 3.50 | 7-8 | | |
| Waverly | | 3.06 | 7-8 | | |
| Zanesville | | 3.80 | 7-8 | | |
| <i>Pennsylvania.</i> | | | | | |
| Aqueduct | | 4.10 | 23-24 | | |
| Cotesville | 11-61 | | | | |
| Emporium | | | | 2.25 | 1 40 |
| Kennett Square | 10-21 | | | | 23 |
| Pottstown | | 2.80 | 18 | | |
| Selins Grove | | 2.67 | 23-24 | | |
| Warren | | 12-54 | | | |

Table of excessive precipitation—Continued.

| State and station. | Monthly rainfall to inches, or more. | Rainfall 2-50 inches, or more, in 24 hours. | | Rainfall of 1 inch, or more, in one hour. | |
|---|--------------------------------------|---|-------|---|-------|
| | | Amt. | Day. | Amt. | Day. |
| <i>Pennsylvania—Continued.</i> | | | | | |
| West Chester | 10-11 | | | 1-10 | 1 00 |
| West Newton | | | | 1-07 | 0 30 |
| York | 10-77 | 3-56 | 2-3 | | |
| <i>South Carolina.</i> | | | | | |
| Aiken | | 2.60 | 28 | | |
| Belmont | | | | | |
| Charleston | | 3.81 | 19-20 | | |
| Florence | | 2.51 | 28 | | |
| Hardeeville | | | | 1-31 | 0 50 |
| Do. | | 2.86 | 18 | 2.86 | 2 00 |
| Jacksonborough | | 2.51 | 1 | | |
| Saint Georges | | 15.32 | 4-80 | 20 | |
| Do. | | 2.50 | 26 | | |
| Statesburgh | | | | 1-87 | 1-17 |
| <i>South Dakota.</i> | | | | | |
| Flandreau | | | | 1-40 | 0 35 |
| Forest City | | 2.72 | 5-6 | 2-25 | 0 40 |
| Gary | | | | 1-30 | 0 30 |
| Parkston | | | | 1-58 | 1 00 |
| Rapid City | | | | 1-33 | 0 43 |
| <i>Tennessee.</i> | | | | | |
| Arlington | | 3-15 | 28-29 | | |
| Bethel Springs | | 3-08 | 29 | | |
| Dunlap | | | | 1-25 | 0 35 |
| Fayetteville | | 4-65 | 31 | | |
| Franklin | | | | 1-02 | 0 45 |
| Grand Junction | | 3-24 | 28-29 | | |
| Hohenwald | | 2.79 | 29 | | |
| Lynnville | | | | | |
| Memphis | | 4-59 | 31 | | |
| Nunnelly | | 3-50 | 28-29 | | |
| Savannah | | | | 1-47 | 1 00 |
| Sharp | | 2-75 | 29 | | |
| Trenton | | 3-01 | 23 | | |
| <i>Texas.</i> | | | | | |
| Berlin | | | | 1-50 | 0 45 |
| Brazoria | 11-57 | 5-09 | 4-6 | | |
| Brownsville | | 2-72 | 4 | | |
| Columbia | | 3-40 | 5 | | |
| Do. | | 2-50 | 25 | | |
| Huntsville | | 2-50 | 17 | | |
| Longview | | 2-60 | 16 | | |
| Luling | | | | 1-52 | 0 50 |
| New Braunfels | | 2-72 | 24 | | |
| Quanah | | | | 1-75 | 1 30 |
| <i>Virginia.</i> | | | | | |
| Lynchburg | | | | 1-00 | 0 30 |
| Norfolk | | | | 1-25 | 1 00 |
| Standardsville | | | | 3-14 | 17-18 |
| Staunton | | | | 1-53 | 0 25 |
| <i>West Virginia.</i> | | | | | |
| Parkersburg | | | | 1-50 | 0 55 |
| Do. | | | | 1-00 | 1 00 |
| Ella | | 3-83 | 7-8 | | |
| <i>Wisconsin.</i> | | | | | |
| Ellsworth | | | | 1-25 | 1 15 |
| Fond du Lac | | | | 1-21 | 1 00 |
| Peshtigo | | | | 1-00 | 0 12 |
| Received too late for publication in June, 1891. | | | | | |
| <i>Kansas.</i> | | | | | |
| Emporia | | 10-28 | | | |
| Norton | | 10-84 | | | |
| MAXIMUM RAINFALL IN ONE HOUR OR LESS. | | | | | |
| The following table is a record of the heaviest rainfall during July, 1891, for periods of five and ten minutes and one hour, as reported by regular stations of the Weather Bureau furnished with self-registering gauges: | | | | | |
| Station. | | | | | |
| | | 5 min. | Date. | 10 min. | Date. |
| | | Inch. | | Inch. | |
| Bismarck, N. Dak. | 0-35 | 11 | 0-45 | 11 | 0-90 |
| Boston, Mass. | 0-40 | 4 | 0-47 | 4 | 0-54 |
| Buffalo, N. Y. | 0-10 | 14 | 0-20 | 26 | 0-40 |
| Cincinnati, Ohio* | | | | | |
| Chicago, Ill. | 0-17 | 6 | 0-32 | 6 | 1-20 |
| Cleveland, Ohio | 0-10 | 3 | 0-17 | 3 | 0-24 |
| Denver, Colo. | 0-05 | 6 | 0-10 | 6 | 0-15 |
| Detroit, Mich. | 0-14 | 14 | 0-14 | 14 | 0-33 |
| Dodge City, Kans. | 0-40 | 6 | 0-60 | 6 | 1-00 |
| Duluth, Minn. | 0-25 | 16 | 0-40 | 16 | 1-35 |
| Eastport, Me. | 0-08 | 4 | 0-12 | 4 | 0-33 |
| Galveston, Tex. | 0-26 | 4 | 0-32 | 17 | 0-50 |
| Jupiter, Fla. | 0-45 | 21 | 0-55 | 21 | 1-50 |
| Kansas City, Mo. | 0-09 | 11 | 0-15 | 11 | 0-20 |
| Key West, Fla. | 0-30 | 12 | 0-50 | 12 | 0-69 |
| Marquette, Mich. | 0-20 | 17 | 0-25 | 17 | 0-80 |

Maximum rainfall in one hour or less—Continued.

| Station. | Maximum fall in— | | | | | |
|--------------------------|------------------|-------|---------|--------|---------|-------|
| | 5 min. | Date. | 10 min. | Date. | 1 hour. | Date. |
| | Inch. | | Inch. | | Inch. | |
| Memphis, Tenn. | 0.35 | 26 | 0.45 | 26 | 0.45 | 26 |
| New York, N. Y. | 0.18 | 28 | 0.32 | 28 | 0.45 | 24 |
| New Orleans, La. | 0.22 | 26 | 0.27 | 26 | 0.31 | 25 |
| Norfolk, Va. | 0.27 | 29 | 0.40 | 17, 29 | 1.25 | 17 |
| Philadelphia, Pa. | 0.12 | 29 | 0.18 | 29 | 0.37 | 29 |
| Philadelphia Water Works | 0.12 | 4 | 0.23 | 4 | 0.68 | 4 |
| Pittsburg, Pa. | 0.30 | 30 | 0.37 | 14 | 0.70 | 14 |
| Portland, Oregon | 0.03 | 10 | 0.06 | 10 | 0.10 | 10 |
| Saint Louis, Mo. | 0.09 | 17 | 0.14 | 7 | 0.45 | 7 |
| Saint Paul, Minn. | 0.05 | 21 | 0.07 | 6 | 0.23 | 6 |
| San Diego, Calif. | | | | | | |
| San Francisco, Cal. | | | | | | |
| Savannah, Ga. | 0.47 | 18 | 0.92 | 18 | 1.90 | 18 |
| Washington, D. C. | 0.40 | 15 | 0.50 | 15 | 0.65 | 15 |
| Wilmington, N. C. | 0.23 | 1, 16 | 0.33 | 1 | 0.77 | 25 |

* Register not working.

† Less than 0.05 in 1 hour.

HAIL.

Description of the more severe hail storms of the month is given under "Local storms." Hail was reported as follows: 1st, Iowa, Missouri, New York, South Dakota. 2d, Illinois, Iowa, Kansas, Missouri, North Dakota, Ohio, Virginia, Wisconsin. 3d, Connecticut, Kansas, Maryland, Montana, Nebraska, New Jersey, New Mexico, New York, Ohio, Oregon, Pennsylvania. 4th, Colorado, Montana, Nebraska, New Mexico, New York, Pennsylvania, Utah. 5th, Colorado, South

Dakota, Washington. 6th, Colorado, Kansas, Missouri, Nebraska. 7th, Idaho, Missouri, Nebraska, Oregon, Texas, Wyoming. 8th, Wyoming. 9th, South Dakota. 10th, Iowa, Kansas, Nebraska, Wyoming. 11th, Kansas, Nebraska, North Dakota. 12th, Nebraska, North Dakota, South Dakota, Wyoming. 13th, Kansas, Michigan, Missouri, Wisconsin. 14th, Colorado, Michigan, Nebraska, New Mexico, New York, Ohio. 15th, Colorado, Maryland, Mississippi, Nebraska, New York. 16th, Arizona, Colorado, Iowa, Minnesota, Missouri, Nebraska, Oregon, Wisconsin. 17th, Colorado, Nebraska, Wisconsin, Wyoming. 18th, Colorado, Kansas, Missouri, Montana. 19th, Colorado, Montana, Nebraska, South Carolina. 20th, Michigan, Missouri, Nebraska, New York, North Dakota, Pennsylvania, South Dakota, Virginia. 21st, Colorado, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Dakota, South Dakota. 22d, Colorado, Iowa, Kansas, Minnesota, Missouri, South Dakota. 23d, Colorado, Louisiana, Ohio, South Dakota. 24th, Colorado, Michigan, Missouri, Nebraska, New York, Pennsylvania, West Virginia. 25th, Colorado, Connecticut, Maine, Montana, New Hampshire, New York, North Carolina, Vermont. 26th, Colorado, Connecticut, Kansas, Nebraska, New York, South Dakota, Utah. 27th, Colorado, Maine, Nebraska, South Dakota. 28th, Iowa, Maryland, Nebraska, Nevada, New York, North Dakota, Wisconsin. 29th, Colorado, Iowa, Michigan, Nevada, Oregon, Wisconsin. 30th, Colorado, Nebraska, Pennsylvania. 31st, Colorado, Iowa. Sleet was reported in Colorado on the 27th and 29th.

WINDS.

The normal distribution of atmospheric pressure in July favors southerly winds east of the Rocky Mountains, variable winds over the Rocky Mountain and plateau regions, northerly winds on the north Pacific coast, and south to west winds on the middle and south Pacific coasts. For the current month southeast to southwest winds prevailed over the Atlantic and east Gulf states, Florida, the middle and southeast slopes of the Rocky Mountains, and the middle and northern plateau regions; in the Ohio Valley and Tennessee, the upper Mississippi valley, and on the middle Pacific coast they were generally from southwest to northwest; in the west Gulf states and the lower Rio Grande valley, from the southeast; in the Lake region, from south to west, except over Lake Superior, where they were from northwest to north; in the Red River of the North Valley, from the north; in the Missouri Valley, from the southwest; on the northeast slope of the Rocky Mountains, from the east; on the north Pacific coast, from west to north; on the south Pacific coast, from the west; and over the southern plateau region, variable. The most frequent direction of the wind at each station of the Weather Bureau is shown on Chart II by an arrow flying with the wind.

HIGH WINDS.

[In miles per hour.]

Wind velocities of 50 miles, or more, per hour were reported at stations of the Weather Bureau as follows: 2d, 50, ne., at Chicago, Ill. 4th, 56, sw., at Mount Killington, Vt. 5th, 60, se., at Galveston, Tex.; 57, nw., at Rapid City, S. Dak. 8th, 50, ne., at Chicago, Ill.; 50, sw., at Kitty Hawk, N. C. 14th, 76, nw., at Mount Washington, N. H.; 54, w., at Pueblo, Colo. 15th, 78, sw., at Green Mountain, Me. 21st, 50, n., at Yankton, S. Dak. 26th, 53, n., at Pueblo, Colo. 28th, 50, sw., at Yankton, S. Dak.

LOCAL STORMS.

1st.—Severe local storms occurred in Iowa and Missouri. At Gray, Iowa, a funnel-shaped cloud was reported; it revolved from right to left, and the path of destruction was about 3 rods in width. Seven barns, 2 dwellings, and a schoolhouse were destroyed. At Arcadia, Iowa, a thunderstorm, with heavy rain and hail, moved southward about 7 p. m., central

time, damaging buildings and crops. At Halbur, Iowa, a heavy hailstorm moved south in a path about one mile in width at 6.30 p. m. Near Glendon, Guthrie Co., Iowa, a boy was killed by lightning. At Alta, Iowa, a destructive hailstorm passed over a strip of country about 2 miles in width; a hailstorm also occurred in Sac county. A small funnel-shaped cloud was reported a few miles southwest of Aurelia, Cherokee Co., Iowa, about 5 p. m., which destroyed a barn and several small buildings. Heavy wind, rain, and hailstorms caused damage in Henry, Carroll, Howard, Livingston, and Randolph counties, Mo. At Leonardtown, Md., a heavy rainstorm damaged bridges, roads, and crops.

2d.—A destructive hailstorm visited Ransom and Sargent counties, N. Dak., in the afternoon. A severe wind, rain, and hailstorm occurred in Osborne county, Kans., and in Sumner county, Kans., a child was killed by lightning. A heavy hailstorm was reported in the afternoon at Galena, Ill., and at Goshen, Ind., a man was killed by lightning. A thunderstorm, with light rain and heavy hail, moved southwest over Westside, Iowa, causing damage to buildings, trees, etc. A thunderstorm from the northwest passed over Milwaukee, Wis., at 5.30 p. m., 75th meridian time; the Life Saving Station was struck by lightning and 1 man severely injured. A rain, wind, and thunderstorm occurred at Jupiter, Fla., in the afternoon; electric wires were burned out and the telegraph line was prostrated.

3d.—Severe thunderstorms were reported in Oswego county, N. Y., Berks county, Pa., and Saint Marys county, Md. In Berks county, Pa., 2 barns were struck by lightning and burned. In Saint Marys county, Md., 3 persons were killed and others injured by lightning. At Buffalo, N. Y., a severe gale occurred, the wind reaching a velocity of 46 miles per hour. A heavy thunderstorm, with hail, caused considerable damage near Stafford, Kans. At Walla Walla, Wash., a severe duststorm, with rain, occurred in the evening. The wind reached a velocity of 44 miles per hour from the southwest, and an extreme velocity of 50 miles per hour, causing minor damage.

4th.—A heavy storm of wind and rain commenced at Galveston, Tex., in the evening and continued during the 5th.

At Salt Lake City, Utah, during a thunder and hailstorm lasting 40 minutes, the temperature fell from 90° to 74°. A thunderstorm, with hail and rain, was reported at Genoa, Nebr. During a heavy thunderstorm at Fernandina, Fla., a man was killed by lightning.

5th.—Severe storms occurred on the west Gulf coast and in the lower Mississippi valley. At Galveston, Tex., the wind reached a velocity of 60 miles per hour at 9 p. m., 75th meridian time; parts of the city were submerged by water driven by wind from the Gulf; a small fishing vessel was capsized in the bay about 9 p. m., and 4 persons drowned. A heavy thunderstorm passed over Fort Stanton, N. Mex., between 7 and 8 p. m.; heavy rainfall flooded streams in that region, damaging property on low lands. In the afternoon a destructive thunder and hailstorm visited Rapid City, S. Dak., damaging crops and killing stock. During a heavy thunderstorm at Albion, Kans., several houses were struck by lightning and damage was caused to crops by heavy rain. A severe wind and rainstorm occurred in Bent and Ottawa counties, Colo., in the afternoon. At Alexander, Washington Co., Me., several head of cattle were killed and a barn was struck by lightning and burned.

6th.—A destructive tornado visited Baton Rouge, La., about 6 a. m. It moved northeastward in a path about 300 yards in width, unroofing buildings, uprooting trees, etc., and about a mile from where the destruction commenced it wrecked a building of the State Penitentiary, killing 10 and injuring 38 convicts. At Madison Station, Miss., a storm moved northwest in a path about 100 yards in width about noon, with light rain before and after, but neither thunder, lightning, nor hail. A funnel-shaped cloud with a whirling motion from right to left appeared; it was apparently 400 to 500 feet in height; seemed to open and close, and presented a bright appearance inside. One person was killed, and buildings were destroyed to the value of about \$4,000. Trees torn up by the storm were thrown in all directions. At Van Zants Switch, 12 miles south of Brookhaven, Miss., a storm occurred in the early morning, badly injuring several persons. At Gloster, Miss., a storm moved northeast in a path about $\frac{1}{2}$ mile in width at 7.30 a. m., killing 2 persons and destroying outhouses. Very heavy rain fell before the storm and timber was thrown in all directions. Severe thunderstorms were reported in other parts of Mississippi. Heavy thunder and rainstorms visited Chicago, Ill., and points in the northwest at night. A heavy thunder and rainstorm caused damage to buildings and crops in northeast Nebraska. At Dodge City, Kans., a thunderstorm, with heavy rain and hail, occurred in the evening; 2 houses were struck, and several persons were stunned by lightning. At Sioux City, Iowa, several persons were struck, and 1 person was killed by lightning. At Dubuque, Iowa, heavy rain flooded streets and cellars. Great damage was caused to crops about Davenport, Iowa, by heavy rain.

7th.—Near Prosperity, S. C., a storm moved northeast about 2.45 a. m., with heavy rain, thunder, and lightning. The clouds were small, presenting a glowing appearance, and appeared to revolve from right to left. Objects, such as trees, were thrown in all directions; buildings were damaged to the extent of about \$1,000, and great injury was done to crops. At Baltimore, Md., some damage was caused by heavy rain on the 7-8th, and a building was struck by lightning. At Washington, Pa., a man was stunned by lightning. A severe gale prevailed over Lake Michigan. Heavy rains attended thunderstorms in east Kansas, Nebraska, and west Missouri. At Abilene, Kans., several houses were struck by lightning. Railroad bridges about Omaha, Nebr., were washed away, delaying traffic. A heavy wind, rain, and thunderstorm visited Kyle, Tex. Lightning damaged buildings and electric wires at Kansas City, Mo. A destructive hailstorm occurred at Bellevue, Idaho.

8th.—A heavy gale prevailed over Chesapeake Bay, and damage was done by wind, lightning, and rain in Maryland. A severe storm was reported in the southwest part of Sussex

county, Va. At Michigan City, Ind., a man was reported killed by lightning. Heavy rain washed away bridges, etc., near Meridian, Miss.

10th.—Heavy rain flooded streets and undermined buildings at Sioux City, Iowa. Heavy windstorms were reported in southwest Minnesota.

11th.—Heavy rain washed out railroad tracks and carried away bridges in North Dakota. A destructive hailstorm was reported in the Valley of the Cannon Ball River, N. Dak.

12th.—Severe storms occurred from Michigan to the Dakotas. At Clare, Mich., buildings were unroofed and trees blown down. Near Jamestown, N. Dak., several buildings were destroyed, and crops were damaged by heavy wind and rain. Hailstorms were reported in Dickey county, N. Dak., and near Aberdeen, S. Dak. During a thunderstorm at Key West, Fla., in the evening, 0.50 inch of rain fell in 10 minutes, and the temperature fell 17° in 15 minutes. A waterspout was observed between 4 and 5 p. m. in Tampa Bay, Fla.

13th.—Severe storms occurred in Michigan, Wisconsin, and the upper Mississippi and lower Missouri valleys. In Michigan damage was caused by wind and lightning. A destructive hailstorm was reported in Outagamie county, Wis. At Green Bay, Wis., the wind reached a velocity of 45 miles per hour from the southwest, and the High School building was struck by lightning. A severe windstorm passed over La Crosse, Wis., in the afternoon. Considerable damage was caused to buildings in the south part of Dubuque county, Iowa. At Davenport, Iowa, the wind reached a velocity of 42 miles per hour from the southeast. Severe storms were reported in McLean and Jackson counties, Ill. Disastrous storms visited central and western Missouri. Near Sedalia, Mo., a house was struck by lightning and 1 person killed and another fatally injured. Several buildings were reported struck by lightning in western Missouri and east Kansas, and much damage was caused to property and crops by heavy rain. At Fort Assiniboine, Mont., heavy rain which began on the 11th ended in the early morning; streams in that region were swollen and the Government dam on Beaver Creek was washed away.

14th.—Destructive storms were reported in New York, Pennsylvania, Maryland, Ohio, Indiana, Illinois, Michigan, and Arkansas. At East Ottawa, Cattaraugus Co., N. Y., a revolving storm, with a heavy fall of small hail, caused damage to buildings and trees. In Rockland county, N. Y., several buildings were struck by lightning. Lightning also caused damage in Chautauqua county, N. Y. In Erie county, Pa., 2 persons were killed, another seriously injured, and four buildings were struck by lightning. A heavy thunderstorm occurred at night near Pittsburgh, Pa. An unusually heavy rainstorm occurred in Carroll county, Md. In Saint Marys county, Md., a building was struck by lightning and several persons were injured. A man and 2 horses were killed by lightning at South Bend, Ind. Damage was caused by lightning at Chicago, Ill. About 5.15 a. m., 75th meridian time, a squall moved north off Thunder Bay Island, about 9 miles distant from Alpena, Mich. It appeared to revolve, and the wind was very heavy within its influence for about 7 minutes; rain fell in torrents, the lightning was very vivid, and a loud noise like continuous thunder was heard. A schooner in the path of the storm was damaged to the extent of about \$1,000. About the time this storm occurred the barograph sheet in the Weather Bureau Office at Alpena indicated a sudden decrease in pressure of about .08 inch. A heavy rain and thunderstorm occurred near Little Rock, Ark., in the evening. During a thunderstorm and west gale at Pueblo, Colo., the wind reached a velocity of 54 miles per hour, and the temperature fell 20° in 1 hour.

15th.—Heavy thunderstorms occurred in New England, New York, Pennsylvania, New Jersey, Indiana, and Arkansas. In the Connecticut Valley and Maine buildings were struck by lightning and damage was done by wind and rain. At 5 p. m. a storm broke over Danbury, Conn.; several houses were

struck, and stock was killed by lightning. Damage was caused by lightning in Rhode Island. A heavy hailstorm visited Congers, N. Y., in the evening, and damage was caused along the Hudson River by lightning, wind, and rain. Unusually heavy thunderstorms occurred in Morris county, N. J., and in Erie county, Pa. A hailstorm was reported near Quantico, Md. Several persons were reported killed by lightning near Muncie, Ind.

16th.—During a heavy wind and thunderstorm at West Superior, Wis., in the afternoon, a building in course of construction was blown down, and 5 persons were reported killed or fatally hurt and others injured. Damage was done to other buildings in West Superior and Superior, and destructive thunder and hailstorms occurred throughout northern Wisconsin and northeast Minnesota. Two persons were reported killed by lightning at Clintonville, Wis. At Duluth, Minn., several buildings were blown down and water flooded cellars and basements. Damage was caused by lightning at Alta and Sioux City, Iowa. Thunder and hailstorms were reported in parts of Nebraska. At North Platte, Nebr., the wind reached a velocity of 48 miles per hour from the northwest. A destructive hailstorm occurred in the west part of Weld county and the eastern parts of Larimer and Boulder counties, Colo. During a violent thunder and hailstorm at Fort Grant, Ariz., in the afternoon, the wind reached a velocity of 38 miles per hour, and 0.62 inch of rain fell in 25 minutes.

17th.—A severe thunderstorm occurred at Marquette, Mich., in the afternoon. Considerable damage was caused by heavy rain, and the electric street railway suspended operation. At Huron, S. Dak., 2 buildings were struck by lightning. A heavy rain and hailstorm occurred in the evening at Cheyenne, Wyo.

18th.—About 5 p. m. a tornado passed northeast over the northern part of Charles county, and crossed Prince Georges, Calvert, and Anne Arundel counties, Md., seriously injuring 5 persons, destroying a number of buildings, prostrating trees, etc., the estimated damage amounting to \$12,000. A heavy windstorm prevailed along the New Jersey coast. A violent hailstorm swept over the northern part of Pawnee county, Kans., at night. During a thunder and hailstorm at Castle, Mont., 2 men and 2 oxen were killed by lightning.

19th.—At North Platte, Nebr., a thunderstorm in the evening was followed by a severe west gale, during which the wind reached a velocity of 48 miles per hour, and the temperature fell 22°. At Castle, Mont., hailstones averaging about $\frac{1}{4}$ inch in diameter fell for 10 minutes during a severe thunder and rainstorm.

20th.—A destructive hailstorm visited the eastern part of Hillsdale and the western part of Lenawee counties, Mich., in the afternoon. A thunderstorm, with heavy rain and hail, occurred at Staunton, Va. A severe thunder and hailstorm was reported at and about Schenectady, N. Y., in the afternoon. Heavy rainstorms, attended in places by hail, were reported in North and South Dakota.

21st.—Destructive hailstorms occurred in Minnesota, Nebraska, and the Dakotas, and heavy rain in Cherokee Co., Iowa. A hailstorm covering a strip about 2 miles in width and 30 miles in length passed through Norman Co., Minn., destroying crops, etc.; severe storms were also reported in Steele and Nobles counties, Minn. A hailstorm swept over the north part of Dickey county, N. Dak., and the north part of McPherson county, S. Dak., at night, in a path about 3 miles in width. A heavy rainstorm, with hail, was reported in Cass county, N. Dak., and hailstorms in Brown and Hughes counties, S. Dak. Heavy rain, thunder, and windstorms at night caused considerable damage in central and northwest Iowa. At Spencer, Iowa, 1 man was killed, and several buildings were struck by lightning. A barn was struck by lightning and burned near Panama, Iowa. A severe thunder, rain, and hailstorm occurred at night at Alta, Iowa. Near Hartington, Nebr., 2 persons were seriously injured, and several houses were struck by lightning.

22d.—Heavy storms occurred in western Pennsylvania, southeast Minnesota, Iowa, Kansas, and South Dakota. In western Pennsylvania damage was caused by lightning and heavy rain, and two persons were reported killed by lightning. A heavy wind and hailstorm visited Mower county, Minn., at night. Several buildings were unroofed by wind at Salina, Kans. Destructive hailstorms occurred near Dodge City and Concordia, Kans. At Stilson, Iowa, 7 horses were killed by lightning, and 3 buildings were struck by lightning and burned. A heavy wind, thunder, and hailstorm visited Amana, Iowa, in the early morning. Damage was caused by hail about Pierre, S. Dak.

23d.—Thunder, wind, and rainstorms caused much damage in parts of the Ohio Valley. At Butler, Pa., streets were badly washed, and a building was struck by lightning. At Carlisle, Pa., a building was struck by lightning, and several persons injured. At Wellsville, Ohio, trees were uprooted by wind, small buildings were blown over, and damage was caused by heavy rain. At Akron, Ohio, a barn was struck by lightning and burned. Damage was done by heavy rain, lightning, and hail in other parts of Ohio. Two persons were reported killed by lightning near Greenville, Ill. At Salem, Ind., several buildings were unroofed and trees were uprooted by heavy wind.

24th.—At Albany, N. Y., several houses were struck by lightning in the evening. A violent rainstorm, with hail, visited York and Cumberland counties, Pa. A heavy thunderstorm, with hail and high wind, occurred at Parkersburgh, W. Va., in the afternoon, causing considerable damage. Heavy thunder and rainstorms visited northern Ohio. A heavy rainstorm in the mountains caused considerable damage by flood in and about Genoa, Nev.

25th.—Local storms occurred in the Atlantic coast states from Maine to North Carolina. Heavy thunderstorms, rain, and hail caused damage in parts of Maine. At Groveton, N. H., lightning struck in several places. An unusually heavy rainstorm, with high wind, was reported at Springfield, Mass. A severe thunder, wind, and hailstorm visited Danbury, Conn., in the evening. A violent thunder and hailstorm passed north of Bangall, N. Y., in a path about one mile in width. A destructive hailstorm was also reported in Franklin county, N. Y. A heavy storm was reported in Caroline county, Md. A thunderstorm, with heavy rain and high wind, occurred at Charlotte, N. C., in the afternoon. Destructive storms were reported in other parts of North Carolina. A small tornado was reported in the southeast part of Pawnee county, Kans. Heavy rain caused a washout and landslide on the Colorado Central Railroad near Idaho Springs, Clear Creek Co., Colo. At Furnace Creek, Death Valley, Cal., a violent windstorm began from the northeast at 10.40 p. m., causing a fall in temperature of 20°, and unroofing a small adobe house. Rain began 11 p. m. and continued until 1.15 a. m. of the 26th.

26th.—At Greenville, Pa., a church was struck by lightning in the morning. Damage was caused by lightning at Osborn, Ga. A thunderstorm was reported in the afternoon at Micco, Fla. A heavy gale from the southwest visited the outskirts of Wichita Falls, Tex., in the afternoon, overturning two houses, lifting others from their foundations, and injuring several persons. Violent thunder and hailstorms occurred in South Dakota. At Hot Springs, S. Dak., considerable damage was caused by hail. At Macksville, Kans., a heavy wind storm in the morning damaged buildings and wheat. A heavy thunder and hailstorm swept over Mount Pleasant, Utah.

27th.—A destructive hailstorm was reported in Kennebec and Lincoln counties, Me. A heavy rainstorm occurred at Waynesborough, Miss., in the morning, and at Greenville, Miss., on the 27-28th. During a heavy thunder and rainstorm at Little Rock, Ark., a woman was struck by lightning. A destructive rain and hailstorm occurred at Elm Creek, Nebr., in the evening.

28th.—An exceptionally heavy rainfall caused damage

about Wilmington, Del. Heavy rain and hailstorms were reported in Lancaster county, Pa., and Harford county, Md. A heavy rainstorm caused much damage at and about Council Bluffs, Iowa. At West Bend, Iowa, a hailstorm did considerable damage in a path about $\frac{1}{2}$ mile in width. An unusually severe rainstorm was reported at Helena, Ark., at night. A destructive hailstorm was reported near Ardoch, N. Dak., in the afternoon. Heavy rain in the mountains near Mount Pleasant, Utah, caused damage to bridges, etc. Flood, resulting from heavy rain in the mountains, was very destructive at Austin, Nev.

29th.—An exceptionally heavy rain and thunderstorm

visited Wicomico, Baltimore, Harford, and Cecil counties, Md., in the morning, causing damage by flood. The storm was also severe in Delaware. Damage was caused to fruit and oats near Hudson, Mich., by a hailstorm. Heavy thunder, rain, and hailstorms visited the sections about Sulphur Springs, Storm Lake, and Alta, Iowa.

30th.—Severe thunderstorms occurred over Long Island and New Jersey. At Woodbury, N. J., lightning struck in several places. Very heavy thunder and rainstorms visited Williamsport and Carlisle, Pa., in the afternoon and evening. Heavy rain about West Point, Miss., flooded a part of that town, swept away bridges, and submerged cotton fields.

INLAND NAVIGATION.

FLOODS.

At Kansas City, Mo., the stage of water in the Missouri River was 23.1 feet, 2.1 feet above the danger-line, the morning of the 1st, and the streets of Harlem, on the opposite bank of the river, and surrounding small farms were under water. The river reached its maximum height during the day, and at 5 p. m. had fallen 0.2 foot. On the 2d the river had fallen 0.4 foot at Kansas City, and by the 4th it was below the danger-line. On the 6th the river commenced to rise at Kansas City, and the morning of the 7th it was 0.7 foot below the danger-line. On the 8th it was 0.3 foot below the danger-line, and nearly stationary, and by the 9th it had commenced to fall.

At Sioux City, Iowa, the stage of water in the Missouri River was 14.6 feet the morning of the 4th, the highest point reached this season, and large quantities of logs and drift were running, causing considerable damage to the construction work of the Pacific Short Line bridge. On the 5th the river was falling steadily at Sioux City.

A report of the 6th stated that the Missouri River had formed a new channel at Doniphan Point, one mile east of the one formed the preceding week, and that a number of valuable Missouri farms were submerged. The Missouri River cut its banks and changed channel at several points south of Pierre, S. Dak., during the month.

On the 8th and 9th high water was reported in the Kanawha River, W. Va., and tributaries, and several booms were broken, letting out great quantities of logs.

The new lake in the Colorado Desert, near Salton, San Diego Co., Cal., presented no material change during the month.

Heights of rivers above low-water mark, July, 1891 (in feet and tenths).

| Stations. | Danger-point on gauge | Highest water. | | Lowest water. | | Monthly range. |
|---------------------------|-----------------------|----------------|---------|----------------|---------|----------------|
| | | Date. | Height. | Date. | Height. | |
| <i>Red River.</i> | | | | | | |
| Shreveport, La. | 29.9 | 1 | 16.9 | 31 | 3.5 | 13.4 |
| <i>Arkansas River.</i> | | | | | | |
| Fort Smith, Ark. | 22.0 | 31 | 15.2 | 25, 26 | 4.2 | 11.0 |
| Little Rock, Ark. | 23.0 | 1 | 16.5 | 27, 28 | 6.1 | 10.4 |
| <i>Missouri River.</i> | | | | | | |
| Fort Buford, N. Dak. | 18 | | 14.7 | 31 | 11.8 | 2.9 |
| Sioux City, Iowa | 15.7 | 4 | 14.6 | 12 | 11.2 | 3.4 |
| Omaha, Nebr. | 18.0 | 1, 5, 6 | 13.9 | 14, 25 | 11.1 | 2.8 |
| Kansas City, Mo. | 21.0 | 1 | 23.1 | 19, 26 | 15.1 | 8.0 |
| <i>Mississippi River.</i> | | | | | | |
| Saint Paul, Minn. | 14.0 | 2 | 2.9 | 18 | 1.9 | 1.0 |
| La Crosse, Wis. | 13.0 | 1-8 | 4.6 | 30, 31 | 2.4 | 2.2 |
| Dubuque, Iowa | 16.0 | 9 | 4.9 | 28-31 | 2.3 | 2.6 |
| Davenport, Iowa | 15.0 | 9, 10 | 5.4 | 30 | 1.2 | 2.2 |
| Keokuk, Iowa | 14.0 | 7, 12 | 3.6 | 31 | 1.4 | 2.2 |
| Saint Louis, Mo. | 30.0 | 4 | 23.7 | 30 | 14.0 | 9.7 |
| Cairo, Ill. | 40.0 | 7 | 24.6 | 31 | 14.0 | 10.6 |
| Memphis, Tenn. | 33.0 | 1 | 19.4 | 31 | 10.9 | 8.5 |
| Vicksburg, Miss. | 41.0 | 5-8 | 29.4 | 31 | 17.7 | 12.7 |
| New Orleans, La. | 13.0 | 10 | 10.2 | 31 | 5.5 | 4.7 |
| <i>Ohio River.</i> | | | | | | |
| Parkersburg, W. Va. | 38.0 | 12 | 12.8 | 4 | 5.2 | 7.6 |
| Cincinnati, Ohio | 45.0 | 14, 15 | 15.2 | 23, 24 | 9.7 | 8.5 |
| Louisville, Ky. | 24.0 | 1 | 8.6 | 23, 24 | 5.5 | 3.1 |
| <i>Cumberland River.</i> | | | | | | |
| Nashville, Tenn. | 40.0 | 6 | 5.3 | 30 | 1.7 | 3.6 |
| <i>Tennessee River.</i> | | | | | | |
| Chattanooga, Tenn. | 33.0 | 31 | 5.7 | 18 | 2.7 | 3.0 |
| Knoxville, Tenn. | 29.0 | 31 | 2.2 | 7, 14, 15 | 1.2 | 1.0 |
| <i>Monongahela River.</i> | | | | | | |
| Pittsburg, Pa. | 29.0 | 9 | 12.5 | 15 | 2.7 | 9.8 |
| <i>Savannah River.</i> | | | | | | |
| Augusta, Ga. | 32.0 | 31 | 12.6 | 5, 6 | 6.4 | 6.2 |
| <i>Willamette River.</i> | | | | | | |
| Portland, Oregon | 15.0 | 1 | 11.8 | 31 | 6.7 | 5.1 |
| <i>Susquehanna River.</i> | | | | | | |
| Harrisburg, Pa. | 17.0 | 25 | 4.4 | 17, 18, 23, 24 | 3.0 | 2.4 |
| <i>Alabama River.</i> | | | | | | |
| Montgomery, Ala. | 48.0 | 11 | 4.8 | 5, 20, 23 | 1.5 | 3.3 |

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were reported as follows: 1st, East Machias, Me. 3d, Medford, Wis. 5th, South Canisteo, N. Y. 6th, Wolsey, S. Dak. 12th, Rockland, Mich. 14th, East Machias, Me. 17th, Peshtigo, Wis. 27th, East Machias, Me. 31st, Salem Corners, Pa.

THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

Thunderstorms were reported as follows: East of the Rocky Mountains they were reported in the greatest number of states, 31, on the 28th; in 20 to 30 on the 2d to 4th, 7th, 14th to 18th, 20th to 27th, 29th, and 30th; in 10 to 19 on the 1st, 5th, 6th, 8th, 10th, 11th, 13th, 19th, and 31st; and in 9 on the 12th. There was no date for which thunderstorms were reported east of the Rocky Mountains in less than 9 states.

East of the Rocky Mountains thunderstorms were reported on the greatest number of dates, 30, in Florida; on 20 to 29 in

Arkansas, Iowa, Kansas, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, New York, North Carolina, Pennsylvania, South Dakota, and Texas; on 10 to 19 in Alabama, Connecticut, Georgia, Illinois, Indiana, Maine, Maryland, Michigan, Montana, New Jersey, North Dakota, Ohio, South Carolina, Tennessee, Virginia, West Virginia, and Wisconsin; and on 1 to 9 in Delaware, District of Columbia, Indian Territory, Kentucky, Massachusetts, New Hampshire, Oklahoma Territory, Rhode Island, and Vermont. There was no state east of the Rocky Mountains in which thunderstorms were not reported on 1 or more dates.

West of the Rocky Mountains thunderstorms were reported in Arizona on the 2d, 3d, 5th, 12th, 14th to 20th, 22d, and 24th to 26th; in California on the 4th, 10th, 23d, 25th, 27th, and 29th; in Colorado on the 2d to 7th, 12th, and 14th to 31st; in Idaho on the 10th, 16th to 19th, 22d, 25th, 26th, 29th, and 30th; in Nevada on the 1st, 2d, 6th, 18th, 20th, and 22d to 31st; in New Mexico on the 3d to 8th, 10th, 13th to 16th, 19th,

22d to 29th, and 31st; in Oregon on the 3d, 5th, 7th, 8th, 10th, 11th, 16th, 17th, 23d, 25th, 28th, and 29th; in Utah on the 3d to 6th, 15th, 17th to 19th, 21st, and 23d to 31st; in Washington on the 5th, 15th to 18th, and 23d to 25th; and in Wyoming on the 3d, 6th to 12th, 14th, 16th to 19th, 23d, 24th, and 26th to 31st.

MISCELLANEOUS PHENOMENA.

DROUGHT.

The month was very dry, and damage to crops by drought was reported over the greater part of lower Michigan, and in east-central South Dakota, southeast Kansas, south Texas, east Arizona, and northwest Washington. In the early part of the month drought conditions prevailed in parts of east

Wisconsin, southern Indiana, southwest Illinois, and parts of Kentucky.

FOREST FIRES.

Destructive forest fires occurred in Chippewa Co., Mich., northern Wisconsin, in Marion, Santa Clara, and Tuolumne counties, Cal., and in the Olympic Mountains near Port Angeles, Wash.

VERIFICATIONS.

FORECASTS FOR 48 HOURS IN ADVANCE.

Appreciating the great importance that long time predictions possess for the general public the Chief of the Weather Bureau has authorized forecasts for 48 and 72 hours, covering the 2d and 3d days in advance. These are optional with the forecast official, and are only made when clearly in the public interest, and cover, in all cases, considerable areas of country, and are not confined to localities.

Percentages of verifications made for second day in advance. Number of predictions made: weather, 135; temperature, 28. Percentages of verifications: weather, 91; temperature, 85; weather and temperature combined, 90.2.

WIND SIGNALS FOR JULY, 1891.

Statement showing percentages of justifications of wind signals for the month of July, 1891.

Wind signals—(Ordered by Professor H. A. Hazen.)—Total number of signals ordered, 65; justified as to velocity, wholly, 39, partly, 2; justified as to direction, 61. All of the signals ordered were cautionary; 25 signals were ordered for easterly winds, of which 22 were justified, and 40 were ordered for westerly winds, of which 39 were justified. Percentage of justifications, 58.9.

No cold-wave signals were ordered, and no temperature-fall warnings were issued during the month.

[Verifications made by Assistant Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast Room.]

FORECASTS FOR 24 HOURS IN ADVANCE.

The forecasts for districts east of the Rocky Mountains for July, 1891, were made by Professor H. A. Hazen, Weather Bureau, and those for the Pacific coast districts were made at

San Francisco, Cal., by 1st Lieutenant John P. Finley, 15th Infantry.

Percentages of forecasts verified, July, 1891.

| State. | Weather. | Temperature. | Weather and temperature combined. | State. | Weather. | Temperature. | Weather and temperature combined. |
|----------------------------|----------|--------------|-----------------------------------|---------------------------|----------|--------------|-----------------------------------|
| Maine | 88.7 | 68.4 | 80.6 | Arkansas | 83.2 | 74.5 | 79.7 |
| New Hampshire | 83.9 | 76.8 | 81.1 | Tennessee | 84.2 | 79.7 | 82.4 |
| Vermont | 86.5 | 69.0 | 79.5 | Kentucky | 90.6 | 82.9 | 87.5 |
| Massachusetts | 91.3 | 73.9 | 81.3 | Ohio | 91.6 | 81.9 | 87.7 |
| Rhode Island | 91.3 | 76.8 | 85.5 | West Virginia | 92.9 | 75.2 | 86.4 |
| Connecticut | 86.8 | 71.6 | 80.7 | Indiana | 94.2 | 81.9 | 89.3 |
| Eastern New York | 87.7 | 69.0 | 80.2 | Illinois | 89.4 | 80.6 | 85.6 |
| Western New York | 82.6 | 71.3 | 78.1 | Lower Michigan | 86.8 | 81.0 | 84.5 |
| Eastern Pennsylvania | 83.2 | 65.5 | 76.5 | Upper Michigan | 81.9 | 72.6 | 78.2 |
| Western Pennsylvania | 83.2 | 80.6 | 82.3 | Wisconsin | 86.5 | 75.2 | 82.0 |
| New Jersey | 79.7 | 65.8 | 74.1 | Tennessee | 90.3 | 70.0 | 82.2 |
| Delaware | 80.3 | 78.1 | 79.4 | Iowa | 89.7 | 81.6 | 86.5 |
| Maryland | 82.0 | 73.5 | 78.6 | Kansas | 83.2 | 73.5 | 79.3 |
| District of Columbia | 77.7 | 77.4 | 77.6 | Nebraska | 87.4 | 78.4 | 83.8 |
| Virginia | 83.9 | 77.4 | 81.3 | Missouri | 90.3 | 78.4 | 85.5 |
| North Carolina | 80.6 | 79.4 | 80.1 | Colorado | 89.4 | 61.6 | 78.3 |
| South Carolina | 86.8 | 78.1 | 83.3 | North Dakota | 88.1 | 82.9 | 85.0 |
| Georgia | 91.6 | 88.7 | 90.4 | South Dakota | 88.4 | 77.1 | 83.9 |
| Eastern Florida | 75.8 | 92.3 | 82.4 | Southern California | 98.7 | 91.0 | 95.6 |
| Western Florida | 85.2 | 94.5 | 88.9 | Northern California | 98.1 | 87.4 | 93.8 |
| Alabama | 90.0 | 88.4 | 89.4 | Oregon | 93.9 | 84.9 | 90.3 |
| Mississippi | 88.4 | 89.4 | 88.8 | Washington | 92.3 | 84.9 | 89.3 |
| Louisiana | 83.2 | 83.5 | 83.3 | Monthly percentage .. | 86.4 | 77.7 | 82.9 |
| Texas | 88.7 | 83.9 | 87.1 | | | | |

In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. The forecasts of temperature in districts east of the Rocky Mountains for July, 1891, were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day. The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10.

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for July, 1891, of the directors of the various state weather services:

ALABAMA.

Temperature.—The mean was 5.3 below the normal; maximum, 100, at Wiggins, 20th, and at Brewton, 1st; minimum, 50, at Camden, 19th; greatest monthly range, 41, at Camden; least monthly range, 22, at Chepultepec.

Precipitation.—The average was 1.87 above the normal; greatest monthly, 10.05, at Valley Head; least monthly, 1.89, at Fort Deposit.

Wind.—Prevailing direction, east.—P. H. Mell, Observer, Weather Bureau, Auburn, director.

ARKANSAS.

Temperature.—The mean was 4.6 below the normal; maximum, 103, at Lead Hill, 22d; minimum, 50, at Fayetteville and Rogers, 9th; greatest monthly range, 50, at Lead Hill; least monthly range, 17, at Winslow.

Precipitation.—The average was 4.14 above the normal; greatest monthly, 12.86, at Hot Springs; least monthly, 2.10, at Lead Hill.

Wind.—Prevailing direction, southwest.—M. F. Locke, Commissioner of Agriculture, Little Rock, director; F. H. Clarke, Observer, Weather Bureau, assistant.

COLORADO.

Temperature.—Maximum, 102, at Fruitia, 24th; minimum, 10, at Breckenridge, 2d; greatest monthly range, 75, at Breckenridge; least monthly range, 31, at Climax.

Precipitation.—Greatest monthly, 8.26, at Brandon; least monthly, 0.28, at Grover.—W. S. Miller, Observer, Weather Bureau, Denver, director.

ILLINOIS.

Temperature.—The mean was 5.2 below the normal of the last 16 years;

maximum, 102, at McLeansborough, 22d; minimum, 41, at Philo, 81st.

Precipitation.—The average was 1.21 below the normal; greatest monthly, 4.46, at East Peoria; least monthly, 0.20, at Louisville.

Wind.—Prevailing direction, northwest.—*John Craig, Observer, Weather Bureau, Springfield, director.*

INDIANA.

Temperature.—Maximum, 99, at Mauzy, 18th; minimum, 41, at Delphi, 81st; greatest monthly range, 55, at Mauzy; least monthly range, 30, at Mount Vernon.

Precipitation.—Greatest monthly, 5.70, at Huntingburgh; least monthly, 0.68, at Rockville.

Wind.—Prevailing direction, northwest.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Observer, Weather Bureau, assistant.*

IOWA WEATHER AND CROP SERVICE.

The month was the coolest July in the last 20 years.

Temperature.—The mean was 6.0 below the normal; maximum, 99, at Stilson, 20th; minimum, 41, at Fayette, 9th, and at Storm Lake, 29th; greatest monthly range, 56, at Stilson; least monthly range, 30, at Independence and McCausland.

Precipitation.—The average was about normal; greatest monthly, 8.20, at Larrabee; least monthly, 1.67, at Bancroft.

Wind.—Prevailing direction, northwest.—*J. R. Sage, Des Moines, director; G. M. Chappel, Observer, Weather Bureau, assistant.*

KANSAS.

Temperature.—The mean was 5.1 below the normal; maximum, 104, at Morton, 10th, and at Macksville, 12th; minimum, 44, at Lakin, 15th; greatest monthly range, 59, at Lakin; least monthly range, 38, at McAllaster.

Precipitation.—The average was 1.61 above the normal; greatest monthly, 11.93, at Kellogg; least monthly, 1.15, at Toronto.

Wind.—Prevailing direction, south.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Observer, Weather Bureau, assistant.*

KENTUCKY.

Temperature.—The mean was about 6.0 below the normal; maximum, 91, at Bowling Green, 22d; minimum, 47, at Middlesborough, 8th; greatest monthly range, 45, at Frankfort; least monthly range, 35, at Franklin and Canton.

Precipitation.—The average was about 1.00 below the normal; greatest monthly, 4.08, at Louisville; least monthly, 1.08, at Bowling Green.

Wind.—Prevailing direction, northeast.—*Dr. E. A. Grant, Louisville, director; Frank Burke, Observer, Weather Bureau, assistant.*

LOUISIANA.

Temperature.—The mean was slightly below the average; maximum, 101, at Liberty Hill, 3d; minimum, 54, at Lake Charles, 5th; greatest monthly range, 45, at Lake Charles; least monthly range, 20, at Plaquemine and Port Eads.

Precipitation.—The average was nearly double the normal; greatest monthly, 14.77, at Marksville; least monthly, 3.88, at Delhi.

Wind.—Prevailing direction, south.—*George E. Hunt, Observer, Weather Bureau, New Orleans, director.*

MARYLAND.

Temperature.—Maximum, 92, at Kirkwood, Del., 19th; minimum, 51, at Cumberland, 12th; greatest monthly range, 39, at Cumberland; least monthly range, 20, at Jewell.

Precipitation.—Greatest monthly, 12.88, at Barren Creek Springs; least monthly, 5.17, at Cumberland.

Wind.—Prevailing direction, southwest.—*William B. Clark, Johns Hopkins University, Baltimore, director; Milton Whitney, Maryland Agricultural College, secretary and treasurer; C. P. Cronk, Observer, Weather Bureau, in charge.*

MICHIGAN.

Temperature.—The mean was 7.2 below the normal; maximum, 93, at Mottville, 21st; minimum, 29, at Roscommon, 31st.

Precipitation.—The average was 0.88 below the normal; greatest monthly, 4.84, at Mayville; least monthly, 0.10, at Grayling.—*N. B. Conger, Observer, Weather Bureau, Lansing, director.*

MINNESOTA.

Temperature.—The mean was about 5.0 below the normal; maximum, 90, at Grand Meadow, 12th; minimum, 34, at Pokegama Falls, 7th and 25th; greatest monthly range, 51, at Pokegama Falls; least monthly range, 27, at Pine River Dam.

Precipitation.—The average was nearly 1.00 below the normal; greatest monthly, 5.47, at Lake Winnibigoshish; least monthly, 1.15, at Montevideo.

Wind.—Prevailing direction, northwest.—*J. H. Harmon, Observer, Weather Bureau, Minneapolis, director.*

MISSISSIPPI.

Temperature.—The mean was about 3.0 below the normal; maximum, 104, at Columbus, 4th; minimum, 58, at Kosciusko, 18th; greatest monthly range, 48, at Vaiden; least monthly range, 20, at West Point.

Precipitation.—The average was 3.13 above the normal; greatest monthly, 12.80, at Columbus; least monthly, 3.99, at Waynesborough.—*R. B. Fulton, Observer, Weather Bureau, University, director.*

MISSOURI.

Temperature.—The mean was 5.0 below the normal; maximum, 93, at Liberty, 12th; minimum, 40, at Adrian, 7th.

Precipitation.—In the southeast section of the state the average was 3.00 below the normal, while in the northwest and parts of the west-central sections there was an excess of 3.00; greatest monthly, 7.30, at Lamonte (2); least monthly, 0.63, at Mine LaMotte.—*Levi Chubbuck, Secretary of State Board of Agriculture, Columbia, director; A. L. McRae, Observer, Weather Bureau, assistant.*

NEBRASKA.

Cool and cloudy weather interfered with farming operations.

Temperature.—The mean was 5.0 below the normal, and was the lowest mean temperature reported for July since 1882; maximum, 100, at Long Pine; minimum, 32, at Long Pine.

Precipitation.—Greatest monthly, 10.41, at Auburn; least monthly, 2.80, at Brandon.—*Prof. Goodwin D. Scezey, Crete, director; G. A. Loveland, Observer, Weather Bureau, assistant.*

NEVADA.

Temperature.—The mean was about 3.0 below the normal; maximum, 102, at Sodaville; minimum, 26, at Hawthorne.

Precipitation.—The average was about 0.04 above the normal; greatest monthly, 1.52, at Candelaria; least monthly, 0.00, at Hot Springs, Humboldt, Mill City, and Palisade.

Wind.—Prevailing direction, southwest.—*Prof. Charles W. Friend, Carson City, director; F. A. Carpenter, Observer, Weather Bureau, assistant.*

NEW ENGLAND METEOROLOGICAL SOCIETY.

Temperature.—The mean was 3.3 below the normal; maximum, 101, at Farmington, 14th; minimum, 35, at Berlin Falls, 28th; greatest monthly range, 62, at Farmington; least monthly range, 26, at Block Island.

Precipitation.—The average was normal; greatest monthly, 8.82, at Florida; least monthly, 1.62, at Falls Village.

Wind.—Prevailing direction, southwest.—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Prof. Fuertes, R. I., secretary; J. Warren Smith, Observer, Weather Bureau, assistant.*

NEW JERSEY.

Temperature.—The mean was 3.8 below the normal; maximum, 95, at Oceanic, 13th; minimum, 40, at Allaire, 27th; greatest monthly range, 51, at Tenafly; least monthly range, 26, at Atlantic City.

Precipitation.—The average was 0.98 above the normal; greatest monthly, 9.41, at Bridgeton; least monthly, 3.08, at Tenafly.—*R. W. McGann, Observer, Weather Bureau, New Brunswick, director.*

NEW YORK.

Temperature.—The mean was 4.3 below the normal; maximum, 95, at Keene Valley, 18th, and at Wedgewood, 14th; minimum, 36, at Sherman, 26th, and at Brookfield, 27th; greatest monthly range, 57, at Keene Valley; least monthly range, 27, at Fort Hamilton.

Precipitation.—Greatest monthly, 9.15, at Minnewaska; least monthly, 1.51, at Fleming.

Wind.—Prevailing direction, southwest.—*Prof. E. A. Fuertes, Dean of the College of Civil Engineering, Cornell University, Ithaca, director; R. M. Hardinge, Observer, Weather Bureau, assistant.*

NORTH CAROLINA.

The month was cool and wet and decidedly unfavorable for the growth of crops.

Temperature.—The mean was 4.1 below the normal; maximum, 97, at Chapel Hill, 7th; minimum, 42, at Franklin, 9th; greatest monthly range, 48, at Franklin; least monthly range, 19, at Hatteras.

Precipitation.—The average was 1.50 above the normal; greatest monthly, 11.49, at Oak Ridge; least monthly, 3.79, at Charlotte.

Wind.—Prevailing direction, southwest.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Herrmann, Observer, Weather Bureau, assistant.*

NORTH AND SOUTH DAKOTA.

Temperature.—The mean was about 4.0 below the normal; maximum, 96, at Oelrichs, S. Dak., 5th; minimum, 34, at Flandreau, S. Dak., 23d; greatest monthly range, 60, at Grand Rapids, N. Dak.; least monthly range, 37, at Parkston, S. Dak.

Precipitation.—The average was about normal; greatest monthly, 7.66, at Wild Rice, N. Dak.; least monthly, 0.45, at Saint Lawrence, S. Dak.

Wind.—Prevailing direction, southeast.—*S. W. Glenn, Observer, Weather Bureau, Huron, S. Dak., director.*

OHIO.

Temperature.—The mean was 4.0 below the normal; maximum, 95, at Bangorville and Waverly, 22d, and was the lowest maximum on record for July; minimum, 41, at Wauseon, 27th.

Precipitation.—The average was 0.41 above the normal; greatest monthly, 8.84, at Zanesville; least monthly, 1.48, at Cleveland.

Wind.—Prevailing direction, southwest.—*Prof. B. F. Thomas, Columbus, director; C. M. Strong, Observer, Weather Bureau, secretary and assistant.*

OREGON.

Temperature.—The mean was 0.4 above the normal; maximum, 106, at Pendleton and Weston, 24th; minimum, 31, at Happy Valley, 6th.

Precipitation.—The average was 1.15 above the normal; greatest monthly, 2.98, at Pendleton; least monthly, trace, at Corvallis.

Wind.—Prevailing direction, north.—*Hon. H. E. Hayes, Master State Grange, Portland, director; B. S. Pague, Observer, Weather Bureau, asst.*

PENNSYLVANIA.

Temperature.—The mean was 4.4 below the normal; maximum, 97, at Huntingdon, 14th, and Wilkes Barre, 15th; greatest monthly range, 53, at Huntingdon; least monthly range, 32, at Swarthmore.

Precipitation.—The average was about 2.00 above the normal; greatest monthly, 11.61, at Coatesville; least monthly, 2.63, at Wysox.

Wind.—Prevailing direction, west.—*Under direction of the Franklin Institute, Philadelphia; L. M. Dey, Observer, Weather Bureau, assistant.*

SOUTH CAROLINA.

Temperature.—Maximum, 98, at Brewer Mine, 15th; minimum, 56, at Brewer Mine, 8th, and at Greenwood, 10th; greatest monthly range, 43, at Brewer Mine; least monthly range, 24, at Walhalla.

Precipitation.—Greatest monthly, 9.94, at Hardeeville; least monthly, 2.81, at Winnsborough.

Wind.—Prevailing direction, southwest.—*A. P. Butler, Observer, Weather Bureau, Columbia, director.*

TENNESSEE.

The month was characterized by generally low temperature and an abnormal amount of rainfall.

Temperature.—The mean was 2.4 below the normal, and with the exception of 1883 was the lowest mean on record for July; maximum, 96, at Union City, 21st; minimum, 52, at Hohenwald and Jackson, 9th and 10th, and at Dunlap, 20th; greatest monthly range, 43, at Union City; least monthly range, 26, at Rugby and Greeneville.

Precipitation.—The average was 0.50 above the normal; greatest monthly, 9.91, at Fayetteville; least monthly, 0.95, at Union City.

Wind.—Prevailing directions, south and southwest.—*J. D. Plunket, M. D., Nashville, director; H. C. Bate, Observer, Weather Bureau, assistant.*

TEXAS.

Temperature.—The mean was 1.0 above the normal, except in the eastern part of the state and in the Rio Grande Valley, where it was deficient; maximum, 107, at Menardville, 7th; minimum, 54, at Weatherford, 12th; greatest monthly range, 52, at Weatherford; least monthly range, 23, at Galveston, Brownsville, Brazoria, and Burnet.

Precipitation.—The average was generally deficient, except along the coast, where there was an excess, and over the Panhandle, where it was about normal; greatest monthly, 11.57, at Brazoria; least monthly, 0.00, at Menardville.—*D. D. Bryan, Galveston, director; I. M. Cline, Observer, Weather Bureau, assistant.*

VIRGINIA.

Temperature.—Maximum, 98, at Richmond; minimum, 46, at Lexington.

Precipitation.—Greatest monthly, 8.90, at Norfolk; least monthly, 2.90, at Blacksburg.—*Dr. E. A. Craighill, Lynchburg, director; J. N. Ryker, Observer, Weather Bureau, assistant.*

WASHINGTON.

Temperature.—The mean was generally in excess throughout the state; maximum, 108, at Walla Walla, 24th; minimum, 33, at Waterville, 6th; greatest monthly range, 69, at Waterville; least monthly range, 40, at Fort Canby.

Precipitation.—The average was deficient on the coast and Sound and excessive in the eastern part of the state; greatest monthly, 1.88, at Baker City, Oregon; least monthly, 0.05, at Tacoma.

Wind.—Prevailing directions, south and north.—*E. B. Olney, Observer, Weather Bureau, Olympia, director.*

WISCONSIN.

Temperature.—The mean averaged 5 to 10 below the normal, the greatest deficiency being in the cranberry region; maximum, 96, at Beaver Dam and Crandon, 18th; minimum, 33, at Crandon, 20th and 26th, at Florence, 8th and 20th, and at Shawano, 9th.

Precipitation.—The average was below the normal, except in the southeast part of the state where there was a small excess; greatest monthly, 4.63, at Peshtigo; least monthly, 0.84, at Cumberland.—*W. L. Moore, Observer, Weather Bureau, Milwaukee, in charge.*

CONTRIBUTIONS AND ORIGINAL ARTICLES.

SOME EXPERIMENTS IN ATMOSPHERIC ELECTRICITY.

By ALEXANDER McADIE, M. A.

[Read before Section B (Physics), meeting of American Association for the Advancement of Science, Washington, D. C., August, 1891.]

Some interesting observations of atmospheric electricity have been made this summer at Blue Hill Observatory, Readville, Mass. The location is excellent, as the summit of the hill has an elevation of about 195 metres above mean tide, and is not only the highest land in eastern Massachusetts, but the highest point within ten miles of the coast from Maine to Florida. Continuous observations of the potential of the air at the summit and base were attempted. The base station is 126 metres below the summit and 1,178 metres northwest. Two similar Mascart photographic registers were used, with similar water-droppers. Continuous observations of atmospheric electricity have been made only at a few of the best equipped observatories, and, up to the present time, always with the bifilar suspension. The records, although exceedingly delicate, as a rule show very marked disturbances not due to the electricity of the air: *e. g.*, the variation due to the inconstancy of the suspension. The apparatus can be fairly judged, perhaps, by the discussion which followed Dr. Fine's paper on the variations of atmospheric electricity at Perpignan, read at the Congress of Meteorologists, held in Paris, 1889. These records were begun in 1882, and have been carried on since with all skill and thoroughness. A comparison of these curves obtained at the College de France, by Mascart, since 1881, at the Parc St. Maur, at Greenwich, and elsewhere, in the effort to deduce the normal diurnal variation, makes plain discrepancies and disagreements which are, without doubt, directly due to the apparatus and its installation. In the United States the only observations that I know of, with this apparatus, are those obtained at Baltimore by the United States Signal Service for some three years, and some, for some months, at Worcester, Mass. The chief cause of this paucity of observations is undoubtedly the difficulty of manipulating and the expense of maintaining the photographic register. The expense of the necessary incidentals is considerable, and the various difficulties met in installing the apparatus make it impossible to use the method elsewhere than in a well-equipped observatory. The Mascart self-register requires, for a true record, a dark room, stone piers, constant hygrometric and temperature conditions, and the successful fixing of the record by photography. Observations of the potential of the air are therefore not likely to become general with such apparatus. And, furthermore, it is impossible, where photography is employed, to know what the value of the potential is at any moment. The electrometer for general use, say, for example, for use at the various stations of the Weather Bureau, at experimental stations, etc., must, first of all, be one giving a record that can be easily read at any hour of the day. The above considerations have led to the construction of a new type of electrometer, known as the Multiple Quadrant Electrometer, and a working model has been built, and some tests of its efficiency made. Accompanying curves show records of potential values ob-

tained in this way. The instrument is essentially an enlarged Quadrant Electrometer, with the parts so arranged as to be convenient of access, and instead of the four quadrants, single needle, and bifilar suspension, we use some eighty large quadrants, a needle with twenty blades, and a very fine platinum wire for suspension and directive force. The present instrument has its defects, plenty of them, no doubt; but besides the great advantages of the mechanically registered curve, recording the actual motion of the needle, is the greater one of seeing and getting at any moment the potential of the air, not having to wait 24 hours therefor, and the ability to compare directly these curves with the curves of atmospheric pressure, temperature, humidity, wind direction, wind velocity, cloudiness, etc., as given by self-recording instruments.

Charts obtained, but omitted here:

1. Curves of electrical potential, with pressure, temperature, and relative humidity.
2. Statoscope curve, showing changes in pressure during thunderstorm.
3. Cinemograph curve, showing velocity of wind at each moment during thunderstorm.

FLUCTUATIONS OF TEMPERATURE AND PRESSURE AT THE BASE AND SUMMIT OF MOUNT WASHINGTON.

By Professor H. A. HAZEN, Weather Bureau.

A great deal of interest has been developed in the study and discussion of temperature at mountain stations, both in the United States and abroad.

Continuous observations were maintained at Mount Washington, N. H., by the Signal Service from 1871 to September, 1887, and it is believed that these are the most satisfactory that have ever been taken at a mountain station, since this summit rises 6,279 feet above sea-level, and is crossed by a very large number of storms and high areas. The observations at the base were made by Dr. Hiram Cutting at Lunenburgh, Vt., which is about 1,100 feet above sea-level, and 28 miles distant in a direction nw. by w. from Mount Washington.

At the end of the charts in this REVIEW there are given tracings of the temperature fluctuations at Mount Washington and Lunenburgh, and of pressure at the latter station alone, for the months of January, February, and March, and for the years 1871, 1872, 1873, and 1874.

The pressures are projected from observations made three times each day, without modification, but the diurnal range has been eliminated from the temperature in the following manner: The night observation was projected without change, but to each morning observation there was added the difference between the mean monthly temperature at night and in the morning, while in the afternoon the difference between the means for the month was subtracted from each observation. It is proposed to publish these curves for the observations of at least 12 years.

Meteorological record of Army post surgeons, voluntary, and other co-operating observers, July, 1891.

| Stations. | Temperature. (Fahrenheit.) | | | Precip'tn. | Stations. | Temperature. (Fahrenheit.) | | | Precip'tn. | | | | | |
|----------------------|-------------------------------|-------|-------|------------|---------------------|-------------------------------|-------|-------|------------|-----------------------------|-------|-------|-------|------|
| | Max. | Min. | Mean | | | Max. | Min. | Mean | | | | | | |
| Alabama. | 9 | 8 | 8 | | Ina. | Arkansas—Cont'd. | 9 | 8 | 8 | | | | | |
| Bermuda †. | 93 | 67 | 79.1 | 2.63 | El Dorado | 91 | 55 | 73.5 | 4.38 | Ina. | | | | |
| Easemor. | 93 | 60 | 77.5 | 7.68 | Fayetteville*. | 93 | 59 | 73.7 | 5.43 | | | | | |
| Brewton †. | 100 | 65 | 81.0 | 4.25 | Forrest City †. | 96 | 57 | 77.5 | 5.44 | | | | | |
| Camden. | 91 | 46 | 68.5 | 9.03 | Fulton | ..... | ..... | ..... | 4.08 | | | | | |
| Chepultepec †. | 85 | 63 | 75.9 | 3.76 | Harrisburg | 91 | 65 | 74.5 | 3.83 | | | | | |
| Chiderburgh. | ..... | ..... | ..... | 4.35 | Helena(1). | ..... | ..... | ..... | 7.68 | | | | | |
| Citronelle †. | 98 | 68 | 80.4 | 4.52 | Helena(2). | 100 | 59 | 76.2 | 9.32 | | | | | |
| Claiborne Landing. | ..... | ..... | ..... | ..... | Hot Springs | 98 | 51 | 76.6 | 12.86 | | | | | |
| Columbiania †. | 93 | 57 | 76.5 | 5.30 | Lend Hill*. | 103 | 53 | 77.7 | 2.10 | | | | | |
| Cordova †. | ..... | ..... | ..... | 7.35 | Lonoke | 95 | 59 | 75.6 | 11.73 | | | | | |
| Decatur (1) †. | 92 | 55 | 74.2 | 5.23 | Malvern | 99 | 59 | 79.3 | 7.20 | | | | | |
| Eufaula (1) †. | 94 | 55 | 77.8 | 4.96 | Monticello. | 97 | 60 | 80.2 | 5.66 | | | | | |
| Eufaula (2) †. | 95 | 67 | 80.6 | 5.77 | Mount Nebo | 88 | 59 | 73.3 | 8.73 | | | | | |
| Evergreen. | 94 | 67 | 79.6 | 7.36 | New Gascony | ..... | ..... | ..... | 9.03 | | | | | |
| Florence. | ..... | ..... | ..... | 6.95 | Newport(1). | ..... | ..... | ..... | 4.66 | | | | | |
| Fort Deposit. | 96 | 61 | 80.3 | 1.59 | Newport(2). | 98 | 59 | 77.6 | 4.17 | | | | | |
| Gadsden. | ..... | ..... | ..... | 5.24 | Osceola. | 99 | 56 | 74.6 | 3.99 | | | | | |
| Goodwater. | 93 | 61 | 79.4 | 3.25 | Ozone. | 88 | 55 | 73.0 | 7.72 | | | | | |
| Greensborough †. | 94 | 68 | 80.9 | 4.82 | Pine Bluff. | 96 | 60 | 79.2 | 9.92 | | | | | |
| Jasper †. | 59 | 53 | 74.8 | 8.51 | Prescott. | 93 | 61 | 78.3 | 4.50 | | | | | |
| Livingston (1) †. | 92 | 55 | 77.8 | 6.75 | Rogers†. | 93 | 59 | 72.9 | 3.83 | | | | | |
| Livingston (2) †. | 95 | 62 | 78.1 | 6.99 | Stuttgart. | 90 | 54 | 76.5 | 12.11 | | | | | |
| Lynn. | ..... | ..... | ..... | 7.40 | Texarkana. | 99 | 60 | 80.6 | 4.42 | | | | | |
| Marion. | 97 | 60 | 78.2 | 3.84 | Winslow. | 82 | 65 | 73.0 | 5.89 | | | | | |
| Mountain Home. | 92 | 56 | 75.2 | 5.16 | California. | ..... | ..... | ..... | ..... |  |  |  |  |  |
| Mount Willing. | 94 | 66 | 79.8 | 4.14 | Alcalde*. | 115 | 58 | 85.9 | 0.00 | California—Cont'd. | | | | |
| Mt. Vernon B'ks. | 95 | 65 | 79.4 | 3.17 | Aimaden*. | 108 | 57 | 71.3 | 0.00 | Los Angeles*. | 92 | 60 | 76.5 | 0.00 |
| Orrville. | 93 | 61 | 78.7 | 4.34 | Anahiem*. | 106 | 60 | 76.1 | 0.00 | Los Gatos(1)*. | 104 | 50 | 69.0 | 0.00 |
| Opelika. | 93 | 58 | 75.3 | 4.27 | Angel Island. | 88 | 47 | 60.2 | 0.00 | Los Gatos(2)*. | 103 | 45 | 69.5 | 0.00 |
| Pine Apple. | 92 | 63 | 78.8 | 5.46 | Antioch*. | 106 | 60 | 79.1 | 0.00 | Mammoth Tank. | 121 | 57 | 101.7 | 0.00 |
| Pushmataha †. | 92 | 65 | 79.1 | 7.15 | Aptos*. | 84 | 48 | 62.8 | 0.00 | Martinez*. | 90 | 54 | 68.4 | 0.00 |
| Selma (1) †. | 91 | 55 | 77.5 | 2.15 | Athlone*. | 113 | 60 | 85.7 | 0.00 | Menlo Park *. | 95 | 53 | 67.6 | 0.00 |
| Selma (2) †. | 95 | 62 | 78.1 | 6.99 | Bakerfield*. | 114 | 71 | 91.9 | 0.00 | Milton (near). | 105 | 62 | 80.8 | 0.00 |
| Stardevant. | ..... | ..... | ..... | 5.36 | Baldwin Point L. H. | ..... | ..... | ..... | 0.00 | Modesto *. | 107 | 63 | 61.8 | 0.00 |
| Talladega. | ..... | ..... | ..... | 3.31 | Barstow. | 109 | 58 | 84.7 | T. | Mohave *. | 112 | 65 | 87.5 | T. |
| Tallasseco Falls. | ..... | ..... | ..... | 2.79 | Beaumont. | 108 | 61 | 85.0 | | Monson. | 110 | 66 | 88.5 | 0.00 |
| Tuscaloosa. | ..... | ..... | ..... | 5.78 | Belmont*. | 95 | 57 | 72.1 | | Montague *. | 102 | 60 | 77.5 | 0.00 |
| Tuscumbia (2) †. | 94 | 56 | 76.1 | 7.01 | Benicia Barracks. | 103 | 51 | 71.3 | | Monterey *. | 68 | 59 | 55.8 | 0.00 |
| Union Springs. | 93 | 66 | 76.5 | 4.58 | Berendo. | 118 | 58 | 85.5 | | Monterey (Hotel del Monte). | 86 | 53 | 61.4 | 0.00 |
| Valley Head †. | 90 | 53 | 74.0 | 10.05 | Berkeley. | 98 | 49 | 62.1 | 0.44 | Napa City*. | 100 | 53 | 72.8 | 0.16 |
| Warrior †. | ..... | ..... | ..... | 5.15 | Boulder Creek. | 109 | 42 | 63.2 | 0.06 | National City. | 95 | 55 | 71.4 | 0.00 |
| Wiggins †. | 100 | 64 | 81.8 | 4.98 | Brentwood. | 109 | 56 | 77.5 | 0.00 | Needles *. | 119 | 74 | 97.4 | 0.50 |
| Arizona. | ..... | ..... | ..... | ..... | Brighton*. | 113 | 60 | 85.3 | 0.00 | Newhall. | 116 | 60 | 80.0 | T. |
| Antelope Valley. | ..... | ..... | ..... | 0.32 | Caliente. | 113 | 64 | 87.7 | 0.00 | Orlando*. | 114 | 60 | 84.5 | 0.00 |
| Aris. Canal Co. Dam. | 115 | 64 | 94.1 | 0.72 | Castrovile*. | 78 | 57 | 66.0 | 0.00 | Orngeville fe. | 115 | 52 | 80.9 | T. |
| Benson. | 104 | 73 | 93.1 | 1.19 | Centreville*. | 108 | 60 | 72.8 | 0.00 | Orlando. | 114 | 62 | 89.6 | 0.00 |
| Buckeye. | ..... | ..... | ..... | 0.06 | Colfax*. | 102 | 51 | 76.1 | 0.90 | Pajaro *. | 81 | 50 | 63.6 | 0.00 |
| Calabazas. | 96 | 70 | 82.2 | 1.68 | Colton*. | 112 | 58 | 80.4 | 0.00 | Pedras Blancas L.H. | 99 | 55 | 67.8 | 0.08 |
| Casa Grande*. | 114 | 78 | 98.1 | 0.90 | Corning. | 112 | 65 | 87.9 | 0.00 | Pigeon Point L.H. | ..... | ..... | ..... | 0.00 |
| Chiricahua Mt. | ..... | ..... | ..... | 1.24 | Crescent City. | ..... | ..... | ..... | 0.00 | Placerille (1). | 106 | 58 | 75.9 | 0.05 |
| Crittenden. | ..... | ..... | ..... | 0.43 | Crescent City L.H. | ..... | ..... | ..... | 0.00 | Pleasanton. | 108 | 57 | 76.8 | 0.00 |
| Don Cabesos †. | ..... | ..... | ..... | 0.43 | Crooksville*. | 109 | 56 | 77.5 | 0.00 | Point Reyes L.H. | ..... | ..... | ..... | 0.00 |
| Dragoon Summit. | 100 | 78 | 87.5 | 0.90 | Drexell*. | 113 | 60 | 85.3 | 0.00 | Point Sur L.H. | ..... | ..... | ..... | 0.00 |
| Dudleyville. | 104 | 61 | 84.4 | 0.56 | El Dorado. | 110 | 55 | 81.0 | 0.00 | Point Bonita L.H. | ..... | ..... | ..... | 0.00 |
| Eagle Pass. | 71 | 50 | 80.7 | 0.64 | Elkton*. | 103 | 54 | 77.7 | 0.00 | Point Conception L.H. | ..... | ..... | ..... | 0.00 |
| Farleys Camp. | ..... | ..... | ..... | 88.6 | Elmira. | 112 | 58 | 78.3 | 0.00 | Point Fermin L.H. | ..... | ..... | ..... | 0.00 |
| Florence. | 117 | 61 | 91.9 | 0.21 | El Verano*. | 98 | 57 | 73.1 | 0.00 | Point Hueneme L.H. | ..... | ..... | ..... | 0.00 |
| Fort Apache. | 97 | 54 | 78.8 | 2.72 | Emigrant Gap*. | 90 | 40 | 67.5 | 0.00 | Point Montara L.H. | ..... | ..... | ..... | 0.00 |
| Fort Bowie. | 103 | 61 | 93.4 | 0.28 | Eparito*. | 110 | 60 | 84.0 | 0.00 | Point Pinos L.H. | ..... | ..... | ..... | 0.00 |
| Fort Grant. | 95 | 63 | 91.0 | 1.19 | Evergreen. | ..... | ..... | ..... | 0.00 | Point Reyes L.H. | ..... | ..... | ..... | 0.00 |
| Fort Huachuca. | 100 | 60 | 79.4 | 1.34 | Farmington*. | 114 | 59 | 81.6 | 0.00 | Point Sur H. | ..... | ..... | ..... | 0.00 |
| Fort Mohave. | 120 | 67 | 94.5 | 0.24 | Felton*. | 103 | 54 | 68.7 | 0.00 | Point Arena L.H. | ..... | ..... | ..... | 0.00 |
| Gila Bend (1) †. | 110 | 80 | 97.5 | T. | Fernando*. | 114 | 58 | 79.3 | 0.00 | Point Bonita L.H. | ..... | ..... | ..... | 0.00 |
| Gila Bend (2) †. | 118 | 90 | 99.8 | 0.12 | Florence*. | 98 | 55 | 72.8 | 0.00 | Point Conception L.H. | ..... | ..... | ..... | 0.00 |
| Grand Central Mill. | ..... | ..... | ..... | 0.97 | Folsom*. | 116 | 62 | 84.5 | 0.10 | Point Fermin L.H. | 77 | 48 | 57.4 | T. |
| Maricopa (1) †. | 118 | 83 | 99.0 | 0.13 | Fort Bidwell. | 98 | 39 | 65.4 | 1.55 | Point Hueneme L.H. | 110 | 63 | 77.7 | 0.00 |
| Mount Huachuca. | 100 | 60 | 80.3 | 1.21 | Fort Gaston. | 106 | 41 | 71.4 | 0.70 | Point Montara L.H. | 106 | 59 | 84.7 | 0.30 |
| Natural Bridge. | ..... | ..... | ..... | 0.45 | Fort Mason. | 80 | 45 | 78.4 | 0.11 | Point Reyes L.H. | 118 | 75 | 97.1 | 0.00 |
| New River. | 104 | 61 | 86.2 | 1.16 | Freano. | 115 | 69 | 89.3 | 0.00 | Point Reyes L.H. | 112 | 51 | 74.2 | 0.02 |
| Oracles †. | 102 | 66 | 84.6 | ..... | Galt. | 111 | 68 | 82.3 | 0.00 | Point Reyes L.H. | 113 | 60 | 83.7 | 0.24 |
| Oro. | ..... | ..... | ..... | 0.55 | Georgetown*. | 99 | 48 | 74.8 | 0.42 | Rocklin. | 112 | 65 | 86.1 | 0.00 |
| Pantano. | 106 | 73 | 89.2 | 2.22 | Girard*. | 107 | 55 | 80.5 | 0.73 | Rumsey*. | 109 | 65 | 86.9 | 0.00 |
| Payson. | ..... | ..... | ..... | 0.34 | Glen Ellen. | 108 | 55 | 78.5 | 0.00 | San Joaquin L.H. | 77 | 48 | 57.4 | 0.00 |
| Red Rock. | ..... | ..... | ..... | 1.50 | Goshen*. | 95 | 55 | 73.7 | 0.00 | San Luis L.H. | 106 | 53 | 69.4 | 0.00 |
| Saint Johns. | ..... | ..... | ..... | 0.80 | Keeler. | 112 | 65 | 86.3 | 0.00 | San Mateo*. | 96 | 55 | 67.8 | 0.00 |
| San Carlos. | 117 | 57 | 89.7 | 0.57 | Kent. | 104 | 60 | 79.2 | 0.00 | San Miguel. | 107 | 52 | 74.6 | 0.00 |
| San Simon. | 122 | 70 | 91.1 | 0.48 | Georgetown*. | 99 | 48 | 74.8 | 0.42 | San Pedro*. | 100 | 65 | 75.2 | 0.00 |
| Show Low †. | ..... | ..... | ..... | 1.75 | Girroy. | 108 | 52 | 67.7 | 0.00 | San Joaquin L.H. | 108 | 50 | 75.5 | 0.00 |
| Signal †. | 112 | 61 | 91.3 | T. | Gordon. | 105 | 52 | 67.7 | 0.00 | Santa Ana*. | 108 | 50 | 75.5 | 0.00 |
| Strawberry. | ..... | ..... | ..... | 0.80 | Girard*. | 107 | 55 | 80.5 | 0.00 | Santa Barbara (1). | 96 | 54 | 67.2 | 0.00 |
| Teviston. | ..... | ..... | ..... | 1.75 | Glen Ellen. | 108 | 55 | 75.0 | 0.00 | Santa Barbara (2)*. | 95 | 52 | 70.3 | 0.00 |
| Texas Hill. | 123 | 80 | 96.0 | 0.11 | Goshen*. | 112 | 63 | 85.0 | 0.00 | Santa Barbara L.H. | 95 | 52 | 7 | |

Meteorological record of voluntary observers, &c.—Continued.

| Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | Stations. | Temperature. (Fahrenheit.) | | | Precip'n. |
|-----------------------|-------------------------------|------|------|-----------|--------------------|-------------------------------|------|------|-----------|
| | Max. | Min. | Mean | | | Max. | Min. | Mean | |
| Colorado—Cont'd. | 0 | 0 | 0 | Ins. | Illinois—Cont'd. | 0 | 0 | 0 | Ins. |
| Villas | | | | 1.77 | Beason | 90 | 45 | 68.0 | 3.25 |
| Ward District† | | | | 1.18 | Carlinville* | 94 | 55 | 71.2 | 1.27 |
| Watervale† | | | | 3.34 | Centralia | 90 | 52 | 76.0 | 0.57 |
| Watkins | 80 | 58 | 67.1 | 3.37 | Chester | | | | 2.67 |
| Wray | | | | 2.52 | Collinsville | 94 | 51 | 73.1 | 2.19 |
| Yuma† | | | | 2.98 | Cockrell | 90 | 55 | 69.6 | 2.93 |
| Connecticut. | | | | | East Peoria | 91 | 57 | 73.0 | 4.46 |
| Canton | 92 | 47 | 67.9 | 5.21 | Flora | 96 | 46 | 72.0 | 0.54 |
| Colchester | 84 | 48 | 66.6 | | Fort Sheridan | 89 | 44 | 66.0 | 1.94 |
| Falls Village | | | | 1.26 | Goleonda | 89 | 62 | 74.5 | 1.85 |
| Fort Trumbull | 89 | 50 | 69.6 | 2.46 | Greenville | 94 | 48 | 71.9 | 0.93 |
| Hartford (1) | 86 | 49 | 69.5 | 4.13 | Griggsville | 87 | 57 | 70.8 | 0.98 |
| Hartford (2) | | | | 4.41 | Hennepin | 93 | 42 | 69.0 | 1.99 |
| Lake Konomoc | | | | 2.69 | Irishtown | | | | 0.73 |
| Lebanon | | | | 3.22 | Jordans Grove | 91 | 53 | 73.1 | 0.65 |
| Mansfield | 85 | 48 | 65.2 | 4.96 | Lacon* | 89 | 56 | 71.0 | 1.45 |
| Middleton | 88 | 49 | 67.0 | 4.98 | Lanark | 85 | 53 | 67.1 | 4.39 |
| New Hartford (1)* | 89 | 45 | 63.0 | 4.94 | Louisville | 95 | 55 | 73.3 | 0.20 |
| New Hartford (2) | | | | 4.91 | Martinsville | 94 | 56 | 0.79 | |
| Newington | | | | 4.15 | Mascoutah | 92 | 50 | 73.0 | 0.70 |
| N. Grosvenor Dale | 90 | 52 | 72.8 | 3.91 | Mattoon | 95 | 51 | 72.9 | 1.88 |
| North Woodstock | | | | 3.35 | McLeansborough | 102 | 52 | 73.8 | |
| Southington* | 85 | 47 | 66.8 | 3.65 | Mount Carmel† | | | | 1.37 |
| South Manchester | | | | 4.77 | New Haven† | | | | 2.67 |
| Stevenson | | | | 2.88 | Oiney (1)* | 96 | 55 | 75.4 | 0.50 |
| Thompson | 83 | 52 | 65.2 | | Oiney (2)* | 97 | 59 | 73.3 | 0.78 |
| Voluntown* | 84 | 42 | 67.0 | 2.56 | Oswego* | 88 | 50 | 66.4 | 3.07 |
| Wallingford | | | | 5.43 | Ottawa† | 91 | 45 | 69.0 | 4.45 |
| Waterbury | 93 | 45 | 67.8 | 4.17 | Palestine | 93 | 50 | 70.6 | |
| West Simsbury | | | | 5.11 | Peoria (1)* | | | | 2.84 |
| Delaware. | | | | | Peoria (2) | 92 | 52 | 72.7 | 2.82 |
| Dover | 88 | 54 | 70.6 | 8.59 | Philo | 95 | 41 | 72.1 | 1.52 |
| Kirkwood | 92 | | 75.0 | | Pontiac | 90 | 48 | 71.2 | 2.65 |
| District of Columbia. | | | | | Riley* | 84 | 48 | 65.4 | 2.40 |
| Long Bridge† | | | | 8.98 | Rockford | 86 | 46 | 67.8 | 2.27 |
| Dist'g Reservoir* | 85 | 57 | 71.8 | 0.97 | Rock Island Ara† | | | | 3.09 |
| Rec'g Reservoir* | 84 | 58 | 71.9 | 8.00 | Rushville | 95 | 46 | 72.6 | 4.78 |
| Washington B'sks | 89 | 55 | 74.2 | 9.66 | Sandwich | 95 | 44 | 67.4 | 3.18 |
| Florida. | | | | | Sycamore | 85 | 53 | 66.6 | 2.00 |
| Alva† | 97 | 69 | 80.0 | 8.34 | Warsaw | | | | 1.86 |
| De Land (1) | 98 | 64 | 82.0 | 14.33 | White Hall* | 88 | 54 | 74.1 | 0.92 |
| De Land (2) | 94 | 64 | 80.7 | | Winnebago | 90 | 48 | 67.0 | 2.13 |
| Eustis* | | | | 5.67 | Indiana. | | | | |
| Fort Barrancas | 99 | 62 | 83.8 | 5.37 | Angola | 92 | 47 | 71.3 | 3.36 |
| Fort Meade* | 91 | 69 | 78.9 | 6.73 | Columbia City | 90 | 50 | 69.5 | 3.14 |
| Gaineville | 96 | 68 | 78.4 | 4.23 | Columbus | 94 | 53 | 70.5 | 1.61 |
| Hypoluxo* | 94 | 50 | 82.8 | 8.87 | Connerville | 88 | 50 | 68.7 | 3.77 |
| Merritts Island† | 94 | 70 | 82.8 | 3.15 | De Gonia Springs | 90 | 55 | 72.9 | 4.11 |
| Orange City | 94 | 66 | 81.4 | 12.01 | Delphi | 91 | 41 | 66.2 | 3.12 |
| St. Francis B'sks | 94 | 69 | 80.1 | 4.66 | Evansville | | | | 4.52 |
| St. Petersburg† | 97 | 71 | 83.5 | 7.58 | Farmland | 92 | 54 | 70.5 | 2.35 |
| San Antonio* | 95 | | 83.6 | 7.46 | Huntingburgh | 96 | 60 | 76.0 | 5.70 |
| Tallahasse* | 89 | 67 | 77.0 | 5.35 | Huntington† | | | | 2.80 |
| Tarpon Springs | 92 | 68 | 81.1 | 5.19 | Jeffersonville | 91 | 53 | 73.9 | 4.03 |
| Georgia. | | | | | La Fayette | 95 | 42 | 70.3 | 1.60 |
| Albany | 95 | 67 | 82.0 | 7.23 | Logansport (1) | | | | |
| Allapaha | 94 | 62 | 80.2 | 5.40 | Logansport (2) | 92 | 44 | 69.7 | 1.19 |
| Americus | 104 | 64 | 83.0 | 5.43 | Mareno | 95 | 54 | 73.7 | 2.42 |
| Athens (1) | 92 | 60 | 76.3 | 6.46 | Marion† | 94 | 41 | 67.8 | 2.24 |
| Athens (2) | 94 | 60 | 77.0 | 5.74 | Mausy* | 99 | 44 | 69.9 | 1.25 |
| Bainbridge | 92 | 70 | 80.4 | 5.78 | Michigan City | 90 | 47 | 70.3 | 3.35 |
| Blakely | 92 | 70 | 81.4 | 7.78 | Mount Vernon (2) | 92 | 62 | 74.0 | 2.56 |
| Camak | 96 | 62 | 78.9 | 1.70 | Muncie | 94 | 60 | 77.2 | 1.93 |
| Carterville | 94 | 60 | 77.0 | 8.76 | Point Isabel | 94 | 45 | 68.4 | 2.56 |
| Columbus | 91 | 66 | 77.3 | 8.20 | Princeton | 94 | 52 | 74.2 | 1.45 |
| Cordele† | 100 | 63 | 81.2 | 7.35 | Richmond | 90 | 50 | 72.1 | 2.15 |
| Eastman | 100 | 64 | 80.6 | 6.21 | Rockville | 95 | 45 | 71.5 | 0.68 |
| Elberton† | 96 | 65 | 77.5 | 8.27 | Rushville† | | | | 1.10 |
| Forsyth* | 97 | 70 | 79.3 | 5.44 | • Seymour | 90 | 57 | 72.5 | 2.00 |
| Fort Gaines | 93 | 57 | 74.4 | 10.38 | Shelbyville | 95 | 60 | 76.9 | |
| Gainesville | 90 | 56 | 74.8 | 6.68 | Terre Haute | | | | 0.45 |
| Gillaville | 90 | 65 | 78.1 | 7.11 | Vevey | 93 | 54 | 72.2 | |
| Griffin | 98 | 50 | 79.2 | 3.17 | Vincennes | | | | 1.30 |
| Hephzibah | 99 | 68 | 78.5 | 4.03 | Worthington | 92 | 51 | 73.7 | |
| Macon | 98 | 62 | 79.7 | 5.75 | Indiana Territory. | | | | |
| Marietta† | 90 | 58 | 73.6 | 5.54 | Eufaula | | | | 5.16 |
| Milledgeville† | 94 | 65 | 78.8 | 4.03 | Fort Supply | 98 | 55 | 76.4 | 8.12 |
| Millen | 100 | 56 | 78.8 | 6.17 | Healdton | 98 | 59 | 79.4 | 2.83 |
| Monticello. | | | | 6.57 | South McAlester | 94 | | | 2.83 |
| Newnan | 94 | 57 | 76.2 | 4.01 | Tulsa† | | | | 3.15 |
| Point Peter* | 94 | 60 | 73.6 | 4.66 | Woodward | | | | 4.72 |
| Poulson | 97 | 64 | 76.8 | 5.37 | Iowa. | | | | |
| Quinnan (2) | 98 | 68 | 78.8 | 7.18 | Alta (1)* | 87 | 45 | 67.6 | 6.21 |
| Rome† | | | | 8.47 | Alta (2) | 90 | 45 | 65.4 | 6.18 |
| Thomasville (2) | 96 | 66 | 80.5 | 4.90 | Amanfa | 89 | 44 | 67.8 | 2.66 |
| Toccoa | 92 | 58 | 75.4 | 9.58 | Carroll? | 96 | 45 | 67.8 | 4.80 |
| Union Point | 96 | 59 | 76.0 | 6.01 | Cedar Rapids† | 92 | 45 | 68.1 | 3.21 |
| Washington | 97 | 63 | 79.1 | 3.48 | Atlantic | 94 | 43 | 68.9 | 6.16 |
| Way Cross. | 92 | 64 | 79.6 | 3.80 | Audubon | | | | 4.28 |
| Waynesborough | 100 | 63 | 79.1 | 6.42 | Bancroft | 87 | 43 | 67.0 | 1.67 |
| West Point | 94 | 68 | 81.1 | 3.95 | Bedford† | | | | |
| Idaho. | | | | | Bell Plaine* | 88 | 48 | 68.3 | 2.69 |
| American Falls | 98 | 38 | 68.9 | 0.77 | Blakerville | 93 | 50 | 69.5 | 4.89 |
| Boise Barracks | 109 | 43 | 73.5 | 0.48 | Carroll? | 96 | 45 | 67.8 | 4.10 |
| Era† | 92 | 22 | 62.8 | 0.86 | Cedar Falls† | 92 | 45 | 70.1 | 3.20 |
| Fort Sherman | 98 | 38 | 67.2 | 0.88 | Charles City | 95 | 45 | 66.5 | 3.18 |
| Henry's Lake | 88 | 29 | 58.5 | 1.71 | Clinton | 91 | 43 | 68.8 | 4.14 |
| Kootenai | 96 | 43 | 66.8 | 1.75 | Clarin* | 87 | 51 | 70.6 | 3.50 |
| Mullan | 97 | 38 | 59.9 | 3.50 | College Springs | 96 | 54 | 72.0 | 5.98 |
| Payette† | 112 | 40 | 75.0 | 0.66 | Cordova | | | | 2.32 |
| Ruthberg. | 103 | 50 | 79.6 | 1.44 | Corning | | | | 4.62 |
| Illinois. | | | | | Corydon | 86 | 48 | 67.8 | 4.30 |
| Alton | | | | | Cresco | 85 | 45 | 65.1 | 4.15 |
| Aurora (1)† | 86 | 42 | 64.8 | 2.35 | Delaware* | 88 | 50 | 63.8 | 3.64 |
| Beardstown† | | | | | Ins. | | | | 5.34 |

Meteorological record of voluntary observers, &c.—Continued.

| Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | Stations. | Temperature. (Fahrenheit.) | | | Precip'n. |
|--------------|-------------------------------|------|------|-----------|---------------|-------------------------------|------|------|-----------|
| | Max. | Min. | Mean | | | Max. | Min. | Mean | |
| Iowa—Cont'd. | 0 | 0 | 0 | Ins. | Demson | 90 | 45 | 71.4 | 5.95 |
| Beason | 90 | 45 | 68.0 | 3.25 | Eagle Grove | 92 | 52 | 56.5 | 3.60 |
| Carlinville* | 94 | 55 | 71.2 | 4.46 | Fairfield† | 90 | 49 | 69.5 | 3.91 |
| Centralia | 90 | 52 | 76.0 | 0.57 | Fayette | 90 | 41 | 65.1 | 3.45 |
| Chester | | | | | Fontanelle | | | | 3.59 |
| Collinsville | 94 | 51 | 73.1 | 2.19 | Fort Madison* | 94 | 53 | 7 | |

Meteorological record of voluntary observers, &c.—Continued.

| Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | | | | | |
|-------------------------|-------------------------------|------|-------|-------------|-------------------------|-------------------------------|------|------|---------------------|----------------------------|------|------|------|-------|
| | Max. | Min. | Mean | | | Max. | Min. | Mean | | | | | | |
| <i>Maryland—Cont'd.</i> | 60 | 60 | 60 | Ins. | <i>Michigan—Cont'd.</i> | 60 | 60 | 60 | Ins. | | | | | |
| Leonardtown | 90 | 70.2 | 10.32 | Birch Run † | 60 | 43 | 66.2 | 3.19 | Holly Springs (1) * | | | | | |
| McDonogh | 85 | 54 | 69.9 | 8.58 | Birmingham | 60 | 43 | 65.7 | 2.44 | Holly Springs (2) * | | | | |
| Mt. St. Mary's Col. | 87 | 56 | 72.0 | 8.45 | Calumet † | 81 | 44 | 58.7 | 1.05 | Jackson | 98 | 62 | 80.3 | 6.03 |
| Taneytown † | | | | | Caldwell † | 89 | 37 | 62.8 | 1.20 | Kosciusko † | 92 | 53 | 76.4 | 7.20 |
| Woodstock J. | 84 | 56 | 69.0 | .... | Charlevoix † | 88 | 48 | 65.3 | 1.67 | Lake | 94 | 60 | 79.3 | 0.97 |
| Great Falls* | 87 | 57 | 71.8 | 7.50 | Chebogyan † | 90 | 33 | 61.1 | 2.16 | Lafayette | 94 | 65 | 80.2 | 4.75 |
| <i>Massachusetts.</i> | | | | | Colon | 89 | 44 | 62.8 | 2.92 | Lafayette | 99 | 55 | 77.9 | 6.59 |
| Adams | 85 | 45 | 65.0 | .... | Concord† | 90 | 41 | 65.8 | 1.47 | Macon | 100 | 60 | 78.2 | 6.12 |
| Amherst | 89 | 43 | 66.5 | 4.79 | Crystal Falls † | 90 | 35 | 60.1 | 1.28 | Mayersville † | 93 | 64 | 81.4 | 8.30 |
| Amherst Ex Sta (1) | 89 | 42 | 66.2 | 5.09 | Deerfield† | 90 | 42 | 64.2 | 2.81 | Natchez | 90 | 64 | 81.4 | 6.71 |
| Amherst Ex Sta (2) | 90 | 42 | 68.2 | 5.28 | Fairview† | 88 | 44 | 66.6 | 2.11 | Okolona | 100 | 58 | 78.7 | 6.25 |
| Andover | 87 | 50 | 66.3 | 3.41 | Fitchburg† | 90 | 41 | 65.1 | 1.90 | Port Gibson | 95 | 58 | 79.2 | 7.36 |
| Ashland | | | | | Flint† | 90 | 40 | 64.1 | 3.87 | Rienzi | 93 | 62 | 77.8 | 6.49 |
| Blue Hill (sum't) | 86 | 53 | 65.9 | 2.80 | Fort Brady | 86 | 38 | 59.0 | 1.98 | Ship Island | 96 | 71 | 83.6 | 5.70 |
| Blue Hill (base) | 87 | 51 | 66.7 | 2.68 | Fort Mackinac | 82 | 44 | 60.2 | 1.65 | Vaiden | 104 | 56 | 79.0 | 10.28 |
| Blue Hill (valley) | 89 | 45 | 66.9 | 3.36 | Fort Wayne | 91 | 45 | 67.4 | 2.51 | Water Valley * | 99 | 58 | 75.2 | 4.36 |
| Boston | | | | | Fremont† | 89 | 40 | 65.7 | 2.06 | Waynesboro' (1) † | 95 | 63 | 77.9 | 7.20 |
| Cambridge (1) | 87 | 51 | 67.3 | 2.83 | Gaylor† | 91 | 31 | 59.8 | .... | Waynesboro' (2) * | 98 | 62 | 80.2 | 5.97 |
| Chestnut Hill | 90 | 49 | 68.5 | 3.44 | Grape† | 90 | 43 | 65.6 | 2.27 | West Point | 90 | 70 | 79.4 | 6.88 |
| Chicopee | | | | | Grayling† | 92 | 35 | 62.5 | 0.47 | Yazoo City † | .... | .... | 6.40 | .... |
| Clinton | | | | | Hanover† | 88 | 44 | 66.3 | 1.87 | <i>Mississippi—Cont'd.</i> | 60 | 60 | 60 | Ins. |
| Concord | 90 | 45 | 67.1 | 2.97 | Hartford | 85 | 34 | 62.7 | 0.99 | Fairbury * | 95 | 62 | 65.6 | 6.55 |
| Cotuit | 84 | 51 | 66.8 | 2.19 | Hart† | 88 | 53 | 67.4 | 2.90 | Fort Niobrara | 87 | 38 | 65.6 | 5.97 |
| Deerfield | 92 | 51 | 68.1 | .... | Hastings | 88 | 44 | 66.9 | 3.24 | Fort Omaha | 98 | 55 | 72.3 | 4.22 |
| Dudley* | 89 | 54 | 67.4 | 2.09 | Hayes† | 90 | 42 | 66.0 | 1.49 | Fort Robinson | 89 | 42 | 66.9 | 3.24 |
| Egg Rock, Nahant. | 82 | 54 | 65.0 | .... | Hightown Station† | 88 | 43 | 64.7 | 2.06 | Fort Sidney | 90 | 49 | 68.8 | 3.51 |
| Fall River (1) * | 84 | 53 | 65.8 | 2.92 | Hillman | 93 | 31 | 61.0 | 1.82 | Franklin | 94 | 46 | 71.1 | 7.22 |
| Fiskedale | | | | | Hillsdale † | 86 | 43 | 67.4 | .... | Fremont* | 90 | 56 | 70.8 | 4.60 |
| Fitchburg (1) | 87 | 50 | 67.6 | 3.95 | Holt† | | | | | Geneva | | | | |
| Fitchburg (2) | 90 | 47 | 66.6 | 3.52 | Howell† | 90 | 40 | 64.6 | 3.31 | Genoa † | 88 | 53 | 60.8 | 5.49 |
| Florida (1) | 86 | 30 | 61.1 | 8.82 | Hudson | 88 | 35 | 62.0 | 2.54 | Gering | 90 | 45 | 68.8 | 2.45 |
| Florida (2) | 95 | 43 | 68.1 | 7.59 | Ivan † | 92 | 36 | 63.4 | 0.91 | Grant | | | | |
| Fort Warren | 83 | 52 | 65.9 | 4.12 | Jackson † | 90 | 39 | 63.6 | 5.97 | Harvard | 86 | 57 | 68.8 | 7.40 |
| Framingham | 89 | 46 | 67.4 | 3.07 | Jeddo † | 87 | 42 | 65.5 | 3.97 | Hastings | 90 | 48 | 66.6 | 6.88 |
| Gilbertville | 88 | 43 | 66.5 | 5.22 | Kalamazoo † | 86 | 50 | 67.2 | 3.81 | Hastings | 90 | 54 | 60.7 | 6.26 |
| Groton (1) | 88 | 50 | 67.9 | 3.47 | Leeds | 87 | 43 | 64.7 | 2.64 | Hay Spring | 90 | 42 | 66.5 | 4.90 |
| Heath* | 93 | 46 | 68.0 | .... | Lansing | 87 | 43 | 66.4 | 2.91 | Hebron | 91 | 48 | 72.0 | 6.61 |
| Hoosac Tunnel | | | | | Lathrop | 94 | 48 | 62.8 | 1.61 | Imperial | 92 | 52 | 67.9 | 4.75 |
| Kendall Green | 90 | 48 | 70.5 | 2.51 | Madison | 90 | 46 | 66.5 | 3.79 | Kimball | 94 | 45 | 68.4 | 4.09 |
| Lake Cochituate | 92 | 41 | 68.0 | 2.99 | Marshall† | 91 | 42 | 66.8 | 2.21 | Lexington* | 92 | 44 | 69.0 | 4.75 |
| Lawrence | 100 | 49 | 70.8 | 2.30 | Montague† | 83 | 41 | 63.4 | 0.85 | Long Pine | 100 | 32 | 67.5 | 5.10 |
| Leicester | 85 | 40 | 61.9 | 3.56 | Motville† | 93 | 41 | 66.8 | 1.35 | Marquette | 92 | 54 | 60.1 | 6.13 |
| Leominster | | | | | North Aurelius | 87 | 40 | 62.4 | 2.54 | Minden | 96 | 52 | 69.7 | 6.26 |
| Long Plain* | 82 | 54 | 68.5 | 2.63 | North Marshall† | 87 | 40 | 62.4 | 2.54 | Nebraska City | 89 | 51 | 71.8 | 7.62 |
| Lowell (1) | 88 | 50 | 68.5 | 3.17 | Olivett† | 84 | 42 | 63.2 | 3.39 | North Loup*† | 93 | 40 | 70.0 | 5.14 |
| Lowell (2) | 90 | 46 | 67.0 | .... | Oscego† | 91 | 40 | 67.2 | 3.24 | Oakdale | 89 | 42 | 68.2 | 8.00 |
| Lowell (3) | 92 | 45 | 68.6 | .... | Ovid† | 90 | 42 | 64.7 | 3.01 | O'Neill | 88 | 50 | 69.4 | 3.64 |
| Ludlow (1) | 86 | 43 | 64.3 | 5.84 | Parkville† | | | | | Ough (1) | | | | |
| Ludlow (2) | 90 | 45 | 66.7 | 5.87 | Paw Paw† | 90 | 40 | 66.5 | 2.97 | Ough (2) | | | | |
| Lynn | 85 | 52 | 65.4 | 3.38 | Pontiac† | 84 | 48 | 66.3 | 1.89 | Palmer | 92 | 40 | 69.5 | 8.75 |
| Mansfield | 91 | 57 | 67.6 | 3.86 | Potowomout | | | | | Paxton | | | | |
| Medford | | | | | Rockland | 88 | 39 | 61.6 | 1.31 | Plattsmouth | | | | |
| Middleborough | 87 | 41 | 65.7 | 3.14 | Rosacommon† | 91 | 29 | 61.2 | 1.95 | Precept* | 92 | 57 | 76.1 | 4.34 |
| Milton* | 87 | 38 | 65.1 | 3.39 | Saint Ignace† | 84 | 36 | 60.4 | 1.34 | Purple Cane * | 83 | 61 | 73.7 | 8.95 |
| Monson | 89 | 44 | 66.3 | 4.88 | Saint Johns† | 89 | 45 | 66.9 | 3.10 | Ravenna | 89 | 43 | 66.5 | 5.10 |
| Mount Nonotuck | | | | | Sand Beach† | 89 | 44 | 62.7 | 2.96 | Sargent | | | | |
| Mystic Lake | | | | | Stanton† | 87 | 38 | 65.0 | 1.83 | Schuyler† | 92 | 46 | 70.8 | 4.95 |
| Mystic Station | | | | | Stockbridge† | | | | | Seward* | 88 | 58 | 73.2 | 7.30 |
| Nahant | 83 | 54 | 65.2 | 3.15 | Thornville† | 90 | 45 | 67.4 | 4.26 | Superior | 102 | 53 | 78.5 | 8.36 |
| New Bedford (1) | 80 | 51 | 64.5 | 2.50 | Vernon | 87 | 46 | 66.7 | 3.06 | Syracuse * | 89 | 57 | 71.9 | 5.75 |
| New Bedford (2) | 82 | 46 | 66.3 | 2.17 | Vienna† | | | | | Tecumseh | 93 | 50 | 71.4 | 7.46 |
| Newburyport (1) | 90 | 50 | 67.1 | 3.67 | Weldon Creek† | 79 | 36 | 60.0 | 1.76 | Teekamah | 94 | 48 | 75.2 | 6.06 |
| Newburyport (2) | | | | | Williamston† | 86 | 46 | 68.9 | 3.01 | Wallace | 94 | 52 | 72.3 | 5.36 |
| Northampton | 93 | 49 | 70.4 | 5.32 | Ypsilanti | 86 | 41 | 62.5 | 2.38 | Weeping Water* | 94 | 47 | 67.8 | 7.84 |
| North Billerica | 93 | 48 | 69.9 | 4.00 | <i>Minnesota.</i> | | | | | West Hill | 85 | 53 | 69.1 | 3.76 |
| Plymouth | 84 | 59 | 68.7 | 2.55 | Alexandria† | | | | | West Point | 85 | 53 | 78.5 | 8.45 |
| Princeton | 84 | 48 | 65.0 | 3.68 | Crookston | 81 | 45 | 65.4 | 2.68 | Wilcox | 96 | 46 | 72.7 | 9.34 |
| Provincetown | 83 | 53 | 67.7 | 2.71 | Farmington | 84 | 52 | 66.2 | 2.28 | York | | | | |
| Randolph | | | | | Fergus Falls† | | | | | <i>Nevada.</i> | | | | |
| Roberts Dam | | | | | Fort Ripley† | | | | | Austin | 89 | 41 | 67.6 | 1.26 |
| Royalston* | 96 | 50 | 67.5 | 5.75 | Fort Snelling | 85 | 44 | 64.5 | 2.72 | Battle Mountain | 99 | 55 | 78.4 | 0.17 |
| Salem (2) | | | | | Grand Meadow | 90 | 52 | 66.6 | 3.32 | Bermont | 89 | 37 | 66.6 | 1.11 |
| Savoy | 83 | 60.0 | 64.4 | 3.45 | Kinbrae* | 93 | 39 | 67.3 | 0.74 | Bewaewe | 97 | 55 | 78.6 | 0.15 |
| Somerset* | 92 | 53 | 71.1 | 4.24 | L. Winnibigoshish | 79 | 46 | 61.7 | 5.47 | Brownsville | 97 | 55 | 84.6 | 0.00 |
| South Hingham | 44 | 34 | 64.1 | 3.21 | Leech Lake | 81 | 35 | 61.0 | 5.23 | Candelaria | 104 | 58 | 72.5 | 1.52 |
| Springfield Arm'y | 88 | 47 | 68.4 | 3.37 | Le Sueur† | 86 d | 52 d | 68.7 | 2.50 | Carlin | 102 | 45 | 72.3 | 0.15 |
| Swampscott (1) | 84 | 51 | 65.4 | 2.81 | Minneapolis* | 85 | 51 | 66.1 | 2.80 | Carson City | 94 | 36 | 69.4 | 0.21 |
| Swampscott (2) | 84 | 50 | 64.4 | .... | Montevideo | 86 | 41 | 66.8 | 1.15 | Cranes Ranch | | | | |
| Taunton (1) | 88 | 47 | 66.4 | 2.46 | Morris | 85 | 38 | 65.7 | 4.74 | Downeyville | 97 | 44 | | |

Meteorological record of voluntary observers, &c.—Continued.

| Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | Stations. | Temperature. (Fahrenheit.) | | | Precip'n. |
|---------------------|-------------------------------|-------|------|-----------|--------------------|-------------------------------|-------|------|-----------|
| | Max. | Min. | Mean | | | Max. | Min. | Mean | |
| N. Hampshire—Con. | 0 | 0 | 0 | Ins. | New York—Cont'd. | 0 | 0 | 0 | Ins. |
| Wiers Bridge | 52 | 52 | 52 | 5.23 | Hammondsport | 87 | 44 | 64.8 | 5.92 |
| Wolfborough | 52 | 52 | 52 | 5.85 | Hess Road Station | 88 | 41 | 65.0 | 5.54 |
| New Jersey. | | | | | Honeymead Brook | 90 | 46 | 66.2 | 5.54 |
| Allaire | 89 | 40 | 67.2 | ..... | Humphrey | 89 | 39 | 63.4 | 7.21 |
| Astbury Park | 82 | 50 | 70.1 | 4.21 | Hyndville | 92 | 39 | 65.1 | 4.41 |
| Bellefonte | ..... | ..... | 5.01 | | Ithaca | 90 | 47 | 67.0 | 4.25 |
| Belvidere | ..... | ..... | 4.52 | | Keene Valley | 95 | 35 | 62.6 | 2.97 |
| Beverly† | 90 | 52 | 69.5 | 4.89 | Kings Station | ..... | ..... | 4.04 | |
| Billingsport L. H.* | 91 | 60 | 73.1 | 8.92 | Le Roy | 89 | 44 | 65.0 | 6.10 |
| Blairstown | 89 | 46 | 57.8 | 4.40 | Liberty | ..... | ..... | 5.29 | |
| Bridgeport* | 89 | 56 | 72.6 | 9.41 | Lockport | 91 | 44 | 63.4 | 3.41 |
| Camden | 91 | 53 | 71.7 | 5.35 | Lowville | 92 | 39 | 62.0 | 7.46 |
| Cape May C. H.† | 83 | 55 | 70.9 | 7.33 | Lyons | 93 | 49 | 66.6 | 2.42 |
| Deckerton | 88 | 49 | 67.3 | 5.13 | Lyon Mountain (2) | ..... | ..... | 4.79 | |
| Dover | 90 | 45 | 67.2 | 4.90 | McLean | ..... | ..... | 2.67 | |
| Egg Harbor City | 89 | 53 | 68.3 | 8.97 | Madison Barracks | 90 | 47 | 66.2 | 3.21 |
| Franklinville | 87 | 52 | 68.4 | 8.91 | Malone | 87 | 41 | 63.4 | 4.80 |
| Freehold | 90 | 50 | 69.3 | 5.24 | Marshland | 85 | 43 | 59.5 | 4.38 |
| Gillette | 93 | 45 | 69.2 | 3.88 | Middleburgh | 92 | 43 | 65.3 | 2.80 |
| Highland Park† | 92 | 49 | 69.9 | 3.25 | Middletown* | 89 | 50 | 68.9 | 4.98 |
| Hightstown | 82 | 55 | 68.9 | 3.12 | Minnewaska | 88 | 45 | 63.6 | 9.75 |
| Imlaystown* | 92 | 53 | 71.4 | 5.63 | Mount Morris | 93 | 41 | 66.2 | 2.95 |
| Junction | 95 | 56 | 72.4 | 5.89 | Newark Valley | ..... | ..... | 4.18 | |
| Lambertville* | 87 | 51 | 70.6 | 4.51 | New Lisbon | 86 | 41 | 59.8 | 4.63 |
| Locktown | 90 | 50 | 69.7 | 5.97 | North Hammond | ..... | ..... | 5.97 | |
| Moorestown* | 90 | 54 | 69.6 | 4.61 | Number Four | 85 | 38 | 60.3 | 5.46 |
| Mount Holly | 90 | 55 | 70.8 | 4.88 | Ogdensburg (1)* | 86 | 47 | 64.2 | ..... |
| Newark (1) | 88 | 57 | 69.9 | 6.73 | Ogdensburg (2) | 88 | 40 | 64.3 | ..... |
| New Brunswick (1) | 94 | 51 | 71.6 | 3.34 | Oxford† | 84 | 42 | 63.1 | 4.27 |
| New Brunswick (2) | 88 | 53 | 68.8 | 3.24 | Palermo† | 93 | 41 | 65.0 | 4.83 |
| Newton | 86 | 53 | 69.0 | 3.68 | Palmyra* | ..... | ..... | 6.83 | |
| Ocean City* | 89 | 57 | 71.0 | 5.90 | Pawling | ..... | ..... | 5.59 | |
| Oceanic | 95 | 56 | 72.4 | 5.89 | Perry City | 90 | 43 | 63.1 | 3.54 |
| Paterson | 92 | 51 | 70.4 | ..... | Plattsburgh B'ks* | 91 | 46 | 65.2 | 5.77 |
| Ranocas | 90 | 59 | 69.5 | 4.88 | Port Jervis | 99 | 46 | 65.3 | 7.43 |
| Somerville | 94 | 46 | 70.8 | 4.01 | Poughkeepsie | 92 | 43 | 67.3 | 5.24 |
| South Orange† | 88 | 49 | 68.2 | 6.00 | Quaker Street† | 90 | 43 | 62.4 | 4.00 |
| Tenafly | 94 | 43 | 68.8 | 3.03 | Hondout | 90 | 49 | 66.8 | 6.43 |
| Trenton* | 92 | 60 | 76.0 | 5.92 | Setauket | 88 | 53 | 68.1 | 1.51 |
| Vineland | 89 | 54 | 70.9 | 8.91 | Sherman | 90 | 36 | 61.1 | 5.39 |
| Whiting | 90 | 54 | 70.0 | 5.99 | Schodack Depot | ..... | ..... | 4.87 | |
| Woodbury | 89 | 57 | 72.0 | 7.13 | South Canisteo | 89 | 37 | 62.0 | 4.62 |
| New Mexico. | | | | | S. E. Reservoir | ..... | ..... | 4.67 | |
| Albert | 100 | 59 | 77.8 | 3.62 | South Kortright | 88 | 37 | 62.0 | 3.67 |
| Antelope Springs | 98 | 46 | 72.6 | 1.43 | Syracuse | ..... | ..... | 2.84 | |
| Bernalillo | ..... | ..... | 0.20 | | Utica | 92 | 43 | 64.7 | 3.79 |
| Chama | 96 | 35 | 65.0 | 3.24 | Victor | ..... | ..... | 5.21 | |
| Coolidge | 86 | 30 | 54.2 | 1.90 | Wappingers Falls | ..... | ..... | 3.91 | |
| Deming | 105 | 75 | 89.0 | 0.18 | Watertown | 89 | 44 | 63.8 | 7.91 |
| Dulce† | 94 | 34 | 66.9 | 2.07 | Watervliet Arsenal | ..... | ..... | 6.35 | |
| Embudo | ..... | ..... | 0.18 | | Watkins† | 93 | 46 | 66.4 | 4.00 |
| Estalina Springs | 95 | 45 | 69.9 | 0.86 | Waverly | 92 | 40 | 65.8 | 2.36 |
| Fort Bayard | 95 | 53 | 72.6 | 1.00 | Wedgewood | 95 | 43 | 64.5 | 2.45 |
| Fort Stanton | 91 | 48 | 69.4 | 1.09 | West Point | 75 | 45 | 66.9 | 4.16 |
| Fort Wingate | 95 | 52 | 71.2 | 1.86 | West Chaey | ..... | ..... | 4.83 | |
| Lordsburgh† | 99 | 54 | 76.8 | 0.32 | White Plains | 84 | 36 | 68.3 | 2.82 |
| Los Lunas | 103 | 70 | 57.7 | 0.00 | Willets Point | 87 | 55 | 69.5 | 5.00 |
| Monero* | 90 | 36 | 60.8 | 2.20 | North Carolina. | ..... | ..... | 6.05 | |
| Nogal | ..... | ..... | 2.09 | | Asheville | 86 | 50 | 68.6 | 5.67 |
| Ohio | 98 | 49 | 74.3 | 0.64 | Bryson City | ..... | ..... | 5.93 | |
| Pojoaque | ..... | ..... | 0.63 | | Chapel Hill* | 97 | 55 | 76.8 | 5.40 |
| Red Canon† | 98 | 53 | 75.4 | 0.49 | Concord* | 92 | 55 | 75.4 | 5.20 |
| Springer | ..... | ..... | 8.29 | | Currituck Inlet | ..... | ..... | 9.23 | |
| Taos | ..... | ..... | 1.17 | | Douglas | 96 | 49 | 75.0 | 9.49 |
| New York. | | | | | Fayetteville | ..... | ..... | 6.05 | |
| Adams Centre | ..... | ..... | 5.59 | | Franklin | 99 | 42 | 66.2 | 5.30 |
| Addison | 90 | 42 | 65.0 | 2.91 | Goldsborough | 94 | 50 | 77.0 | 5.84 |
| Afton | ..... | ..... | 3.64 | | Hendersonville | 82 | 57 | 69.8 | 6.88 |
| Akron | ..... | ..... | 5.06 | | Lenoir* | 84 | 58 | 71.3 | 7.30 |
| Alabama | 89 | 45 | 62.8 | 4.79 | Lexington† | 92 | 54 | 73.8 | 6.51 |
| Albion | 88 | 48 | 64.5 | 3.13 | Littleton† | 93 | 52 | 73.6 | 6.37 |
| Alfred Centre | 88 | 40 | 61.9 | 5.30 | Louisburgh | 86 | 54 | 73.5 | 7.87 |
| Apulia | ..... | ..... | 2.14 | | Lumberton | 93 | 58 | 77.3 | 5.43 |
| Arcade (1) | 85 | 37 | 62.6 | 5.11 | Morganton† | 88 | 51 | 73.0 | 4.61 |
| Au Sable Forks | ..... | ..... | 4.14 | | Mount Airy† | 88 | 45 | 73.1 | 5.47 |
| Avon | ..... | ..... | 3.94 | | Mount Holly† | ..... | ..... | 5.84 | |
| Baldwinville* | 93 | 47 | 66.2 | 3.68 | Mount Pleasant | 90 | 56 | 73.4 | 6.18 |
| Batavia | ..... | ..... | 7.25 | | Murphy | ..... | ..... | 7.88 | |
| Bedford | ..... | ..... | 4.91 | | New Berne | 88 | 54 | 71.2 | 6.53 |
| Beedes d. | 91 | 50 | 66.4 | 1.79 | Oak Ridge† | 92 | 53 | 70.8 | 10.99 |
| Bethlehem Centre | ..... | ..... | 6.30 | | Pittsburgh | 88 | 53 | 72.4 | 7.10 |
| Binghamton | 89 | 44 | 65.4 | 3.30 | Salisbury | 90 | 63 | 77.3 | 5.54 |
| Bloods Depot | ..... | ..... | 3.63 | | Smithfield | 91 | 59 | 77.6 | 5.85 |
| Boys Corners* | ..... | ..... | 70.3 | | Soapstone Mount* | 58 | 72.4 | 8.00 | |
| Brentwood | 86 | 50 | 68.2 | 7.15 | Southern Pines | 95 | 51 | 75.7 | 7.37 |
| Brookfield | 88 | 36 | 62.3 | 3.78 | Wadeborough | 91 | 57 | 75.2 | 5.03 |
| Canton† | 89 | 41 | 64.2 | 6.25 | Wadeville† | 90 | 50 | 74.2 | 5.99 |
| Carmel | 88 | 47 | 67.1 | 3.65 | Washington | 93 | 60 | 76.1 | 5.23 |
| Cherry Creek | ..... | ..... | 3.43 | | Weidlon | 92 | 54 | 74.2 | 5.75 |
| Constableville | 86 | 38 | 60.7 | 5.76 | Willeyton | 92 | 54 | 74.0 | 10.60 |
| Cooperstown | 85 | 42 | 63.3 | 5.03 | North Dakota. | ..... | ..... | 4.32 | |
| David's Island | 87 | 52 | 69.3 | 3.55 | Carrington† | ..... | ..... | 4.32 | |
| De Kalb Junction | ..... | ..... | 5.73 | | Church Ferry† | 83 | 58 | 61.6 | 2.66 |
| Deposit | ..... | ..... | 4.13 | | Davenport | 85 | 40 | 66.3 | 6.52 |
| Easton | ..... | ..... | 3.40 | | Ellendale | 89 | 50 | 69.9 | 5.12 |
| Elmira | ..... | ..... | 68.6 | 2.13 | Fargo† | 84 | 41 | 62.7 | 3.63 |
| Fleming | 90 | 46 | 66.3 | 1.51 | Fort A. Lincoln | 83 | 48 | 64.2 | 4.42 |
| Fort Columbus | 89 | 58 | 71.4 | 4.20 | Fort Buford | 80 | 40 | 67.2 | 3.00 |
| Fort Hamilton | 85 | 58 | 69.6 | 5.42 | Fort Pembina | 85 | 58 | 62.8 | 2.69 |
| Fort Niagara | 86 | 58 | 69.8 | 2.47 | Fort Yates | 88 | 41 | 68.0 | 2.63 |
| Fort Porter | 90 | 42 | 66.2 | 3.62 | Gallatin† | 84 | 44 | 64.3 | 4.43 |
| Fort Schuyler | 87 | 54 | 69.8 | 2.73 | Grafton | 85 | 38 | 61.5 | 4.65 |
| Fort Wadsworth | 89 | 55 | 71.2 | 5.05 | Grand Rapids† | 95 | 35 | 67.5 | 3.95 |
| Geneva | 94 | 45 | 66.5 | 3.78 | Hopetown | 88 | 40 | 62.5 | 5.06 |

Meteorological record of voluntary observers, &c.—Continued.

| Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | Stations. | Temperature. (Fahrenheit.) | | | Precip'n. |
|-------------------|-------------------------------|-------|-------|-----------|-----------|-------------------------------|------|------|-----------|
| | Max. | Min. | Mean | | | Max. | Min. | Mean | |
| North Dakota—Con. | 0 | 0 | 0 | Ins. | Lakota† | 81 | 38 | 60.2 | 2.74 |
| Wiers Bridge | 52 | 52 | 52 | 5.85 | Napoleon† | 85 | 39 | 64.2 | 4.93 |
| Wolfborough | ..... | ..... | ..... |  | Power† | 88 | 42 | 67.6 | 4. |

Meteorological record of voluntary observers, &c.—Continued.

| Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | | | | | |
|----------------------|-------------------------------|-------|------|--------------------|-------------------|-------------------------------|-------|--------|--------------|--|--|--|--|--|
| | Max. | Min. | Mean | | | Max. | Min. | Mean | | | | | | |
| S. Carolina—Cont'd. | o | o | o | Ins. | Tennessee—Cont'd. | o | o | o | Ins. | | | | | |
| Branchville | 95 | 60 | 77.2 | 7.37 | Waynesborough | 92 | 55 | 70.7 | 5.98 | | | | | |
| Cheraw (1)† | 95 | 58 | 77.2 | 5.41 | Arthur City | ..... | ..... | 0.36 | Abingdon | | | | | |
| Cheraw (2)† | ..... | ..... | 6.19 | ..... | Austin (1) | 101 | 72 | 86.4 | 0.10 | | | | | |
| Chester | 95 | 58 | 77.2 | 6.04 | Austin (2) | 98 | 72 | 83.6 | ..... |  |  |  |  |  |
| Conway | 93 | 63 | 79.1 | 6.64 | Belton | 104 | 60 | 88.5 | 1.25 | | | | | |
| Eflingham† | ..... | ..... | 8.23 | Berlin | 105 | 65 | 83.5 | 4.50 | | | | | | |
| Florence | 95 | 60 | 78.5 | 8.15 | Big Spring | ..... | ..... | 1.35 | Big Spring | | | | | |
| Greenville† | 88 | 54 | 72.2 | 6.55 | Brady | 102 | 60 | 81.4 | 0.15 | | | | | |
| Greenwood | 97 | 56 | 77.4 | 3.18 | Brazoria † | 93 | 70 | 80.4 | 1.57 | | | | | |
| Hardeeville | 94 | 60 | 79.0 | 9.91 | Brenham † | 100 | 69 | 84.5 | 0.43 | | | | | |
| Jacksonborough | 94 | 60 | 78.5 | 6.95 | Brownwood† | 105 | 53 | 77.7 | 0.38 | | | | | |
| Kitchens Mills | 92 | 61 | 78.5 | 5.00 | Burnet | 95 | 72 | 81.8 | 0.97 | | | | | |
| Nichols † | ..... | ..... | 7.87 | Camp Eagle Pass | 111 | 62 | 88.9 | 0.00 | | | | | | |
| Port Royal† | 95 | 68 | 79.4 | 5.74 | C'p Pefo Colorado | 102 | 52 | 79.6 | 1.00 | | | | | |
| Saint Georges | 96 | 61 | 78.2 | 15.32 | Childress | ..... | ..... | 2.81 | Childress | | | | | |
| Saint Matthews | 95 | 62 | 78.2 | 4.53 | College Station | 98 | 68 | 82.8 | 1.36 | | | | | |
| Society Hill† | 88 | 60 | 75.5 | 5.13 | Colorado (3) | ..... | ..... | 0.10 | Colorado (3) | | | | | |
| Spartanburg (2) | 96 | 46 | 75.5 | 6.17 | Columbia | 96 | 68 | 81.8 | 5.96 | | | | | |
| Statesburgh | 93 | 61 | 74.6 | 7.25 | Corsicanas (2) | 100 | 65 | 81.7 | 0.59 | | | | | |
| Trial | 93 | 61 | 77.9 | 6.84 | Cuero | 101 | 60 | 85.4 | 1.05 | | | | | |
| Walhalla | 88 | 64 | 75.1 | 5.48 | Dallas (2) | 100 | 62 | 86.20 | 1.47 | | | | | |
| Waterville† | ..... | ..... | 6.95 | Durham | ..... | ..... | 1.41 | Summit | | | | | | |
| Winnisborough | 94 | 64 | 79.4 | 2.81 | Duval | 104 | 72 | 86.3 | 0.40 | | | | | |
| Yorkville | 90 | 57 | 75.0 | 8.46 | Epworth | 97 | 64 | 80.0 | 2.41 | | | | | |
| <i>South Dakota.</i> | | | | | | | | | | | | | | |
| Aberdeen | 88 | 39 | 66.0 | 1.65 | Fort Bliss | 107 | 65 | 85.8 | 0.27 | | | | | |
| Alexandria | 93 | 42 | 68.8 | 3.05 | Fort Clark | 103 | 65 | 85.7 | 0.00 | | | | | |
| Brookings | 88 | 39 | 65.1 | 2.01 | Fort Hancock | 109 | 52 | 83.1 | 0.45 | | | | | |
| Clark | 93 | 41 | 68.6 | 0.99 | Fort McIntosh | 106 | 78 | 87.5 | 2.31 | | | | | |
| Cross | 88j | 42d | 63.6 | 1.80 | Fort Ringgold | 107 | 65 | 87.5 | 0.86 | | | | | |
| De Smet† | ..... | ..... | 66.8 | 1.46 | Fredericksburg | 101 | 62 | 81.9 | 0.98 | | | | | |
| Elkton* | 91 | 34 | 65.3 | 1.19 | Gainesville | 95 | 62 | 80.6 | 1.27 | | | | | |
| Flandreau† | 90 | 34 | 65.8 | 3.05 | Gallinas? | 105 | 63 | 83.9 | 0.23 | | | | | |
| Forestburgh† | 94 | 44 | 66.8 | 1.45 | Graham | 104 | 57 | 83.6 | 3.67 | | | | | |
| Forest City† | 94 | 51 | 78.6 | 7.53 | Grapevine* | 100 | 60 | 81.2 | 1.93 | | | | | |
| Fort Bennett | 96 | 45 | 71.8 | 1.70 | Hartley | 97 | 52 | 75.7 | 2.60 | | | | | |
| Fort Meade | 91 | 43 | 68.2 | 1.75 | Haskell | 105 | 64 | 88.0 | 2.74 | | | | | |
| Fort Randall | 88 | 43 | 69.3 | 3.23 | Haymond | ..... | ..... | 0.85 | Haymond | | | | | |
| Fort Sully | 97 | 48 | 72.4 | 0.78 | Hearne | 98 | 68 | 81.3 | 1.70 | | | | | |
| Gary | 92 | ..... | 1.69 | Houston† | 99 | 65 | 80.0 | 4.85 | | | | | | |
| Highmore | 92 | ..... | 0.72 | Huntsville | 97 | 58 | 82.3 | 3.61 | | | | | | |
| Kimball† | 91 | 44 | 68.6 | 2.53 | Kent | ..... | ..... | 0.18 | Kent | | | | | |
| Millbank† | 90 | 50 | 71.6 | 1.44 | La Grange | 74 | 82.2 | 0.75 | La Grange | | | | | |
| Mitchell† | 88 | 44 | 68.2 | 3.01 | Longview† | 101 | 62 | 82.6 | 3.89 | | | | | |
| Jelrich† | 96 | 39 | 69.4 | 2.92 | Luling | 105 | 68 | 85.8 | 2.24 | | | | | |
| Parker† | 89 | 40 | 68.5 | 1.30 | Menardville | 107 | 69 | 81.2 | ..... |  |  |  |  |  |
| Parkston* | 92 | 55 | 68.2 | 4.00 | Merkel | ..... | ..... | 0.35 | Merkel | | | | | |
| Plankinton† | 89 | 48 | 69.2 | 2.10 | Mesquite | 102 | 63 | 83.0 | 3.37 | | | | | |
| Saint Lawrence* | 92 | 54 | 70.7 | 0.52 | Mountain Springs | 97 | 61 | 80.4 | 1.72 | | | | | |
| Sioux Falls | 89 | 50 | 66.4 | 0.68 | New Braunfels | 100 | 66 | 82.2 | 3.19 | | | | | |
| Spearfish* | 91 | 43 | 68.0 | 2.53 | New Ulm | 98 | 69 | 82.4 | 1.26 | | | | | |
| Tyndall | ..... | ..... | 1.31 | Orange | 93 | 63 | 78.6 | 8.14 | | | | | | |
| Webster | 92 | 37 | 64.1 | 3.43 | Paris | 100 | 63 | 81.4 | 1.07 | | | | | |
| Wessington Sprgs† | 88 | 44 | 68.3 | 2.70 | Quanah† | ..... | ..... | 5.20 | Quanah† | | | | | |
| Wolsey* | 94 | 54 | 71.1 | 0.50 | Roby† | 106 | 64 | 85.4 | 2.91 | | | | | |
| <i>Tennessee.</i> | | | | | | | | | | | | | | |
| Andersonville | 89 | 55 | 70.8 | 2.75 | Round Rock | 100 | 70 | 84.0 | 0.43 | | | | | |
| Arlington | 96 | 54 | 74.5 | 5.58 | San Antonio | 104 | 69 | 84.4 | 0.85 | | | | | |
| Ashwood† | 89 | 55 | 74.0 | 5.06 | Sanderon | ..... | ..... | 0.00 | Sanderon | | | | | |
| Austin* | 92 | 55 | 76.3 | 4.54 | Sherman | 96 | 60 | 80.0 | 1.76 | | | | | |
| Bethel Springs | 88 | 56 | 75.0 | 4.33 | Sierra Blanca (1) | 109 | 42 | 81.8 | 0.73 | | | | | |
| Bolivar (2) | 94 | 54 | 76.5 | 2.39 | Sierra Blanca (2) | 98 | 45 | 72.9 | 0.51 | | | | | |
| Brownsville | 98 | 54 | 77.8 | 2.61 | Silver Falls | 103 | 61 | 81.9 | 1.45 | | | | | |
| Carthage | ..... | ..... | 2.15 | Temple | 101 | 62 | 82.0 | 2.70 | | | | | | |
| Charleston† | ..... | ..... | 5.20 | Tyler | 98 | 64 | 80.8 | 2.01 | | | | | | |
| Clarksville | 92 | 58 | 75.0 | 2.43 | Venus | 97 | 60 | 81.3 | 2.72 | | | | | |
| Clinton† | ..... | ..... | 3.48 | Waco (2)† | 100 | 65 | 83.8 | 1.00 | | | | | | |
| Columbus† | ..... | ..... | 3.73 | Weatherford† | 106 | 54 | 82.4 | 2.61 | | | | | | |
| Covington (1)† | 90 | 56 | 77.9 | 6.03 | Wichita Falls* | 103 | 55 | 79.6 | 3.30 | | | | | |
| Covington (2)† | 95 | 58 | 75.3 | 5.35 | <i>Utah.</i> | | | | | | | | | |
| Daniap | 94 | 54 | 72.1 | 6.50 | Beaver† | 94 | 36 | 66.8 | 1.36 | | | | | |
| Dyersburgh (2) | 99 | 55 | 77.4 | 4.03 | Blue Creek | 105 | 55 | 82.0 | 0.00 | | | | | |
| Fayetteville† | 94 | 61 | 75.2 | 9.91 | Corinne | 99 | 50 | 75.9 | 0.30 | | | | | |
| Florence Station | 90 | 59 | 74.9 | 2.34 | Fort Douglas | 98 | 45 | 72.9 | 0.51 | | | | | |
| Franklin | 93 | 59 | 73.3 | 3.42 | Fort DuChene | 98 | 37 | 69.7 | 0.24 | | | | | |
| Grand Junction | 93 | 52 | 75.5 | 8.07 | Grouse Creek | ..... | ..... | 1.43 | Grouse Creek | | | | | |
| Greeneville | 84 | 58 | 69.6 | 4.36 | Keeton | 103 | 57 | 77.0 | 1.05 | | | | | |
| Harriman | 95 | 56 | 76.4 | 5.34 | Levan | 98 | 71.1 | 71.1 | 0.13 | | | | | |
| Hohenwald | 94 | 53 | 75.0 | 5.16 | Logan | 98 | 42 | 71.1 | 0.13 | | | | | |
| Jackson | 88 | 56 | 71.7 | 2.80 | Loseef | 99 | 36 | 69.8 | 4.40 | | | | | |
| Jackson | 88 | 52 | 72.2 | .... | Moab† | 108 | 51 | 77.1 | 1.35 | | | | | |
| Johnsonville† | ..... | ..... | 1.53 | Mount Carmel† | 97 | 41 | 70.0 | 2.29 | | | | | | |
| Kingston (1)† | ..... | ..... | 4.38 | Mount Pleasant | 74 | 34 | 57.9 | 1.60 | | | | | | |
| Lewisburgh | 88 | 59 | 73.0 | 4.30 | Neph† | 98 | 37 | 69.0 | 0.60 | | | | | |
| Livingston | 80 | 64 | 75.0 | 1.83 | Ogden (1) | 98 | 54 | 75.7 | 10.10 | | | | | |
| Loudon† | ..... | ..... | 4.85 | Ogden (2) | ..... | ..... | 77.6 | 0.25 | | | | | | |
| Lynville | 93 | 55 | 73.3 | 8.81 | Parowan* | 99 | 40 | 71.0 | 1.24 | | | | | |
| McKenzie | 94 | 60 | 78.5 | 1.90 | Price | ..... | ..... | 0.00 | Price | | | | | |
| McMinnville | 89 | 61 | 73.4 | 4.76 | Promontory | 103 | 47 | 73.0 | 0.50 | | | | | |
| Milan | 97 | 54 | 77.0 | 2.74 | Burlington | 90 | 48 | 68.1 | 3.48 | | | | | |
| Missionary Ridge | 85 | 65 | 72.7 | .... | Chesterfield | 99 | 45 | 71.4 | 0.89 | | | | | |
| Newport | 89 | 61 | 75.6 | 4.55 | George | 110 | 60 | 82.0 | 1.15 | | | | | |
| Northville | 88 | 56 | 70.9 | 3.21 | Snowville | 93 | 55 | 73.4 | 0.62 | | | | | |
| Nunnally | 91 | 58 | 73.3 | 3.73 | Stockton | ..... | ..... | 0.61 | Stockton | | | | | |
| Parksville† | 93 | 58 | 73.1 | 7.72 | Terrace | 100 | 60 | 80.4 | 0.60 | | | | | |
| Ridgleton | 90 | 54 | 73.7 | 4.83 | <i>Vermont.</i> | | | | | | | | | |
| Rockwood† | ..... | ..... | 5.42 | Brattleborough (1) | 93 | 43 | 68.2 | 6.26 | | | | | | |
| Rogersville | 90 | 60 | 71.0 | 5.04 | Burlington | 90 | 48 | 68.1 | 3.48 | | | | | |
| Rugby† | 84 | 58 | 70.1 | 2.61 | Chesterfield | 78 | 42 | 59.0 | 4.20 | | | | | |
| Savannah | 89 | 61 | 77.3 | 4.30 | Enosburg Falls† | 90 | 43 | 64.2 | 5.95 | | | | | |
| Sharp | 94 | 60 | 74.2 | 5.66 | Hartland | 88 | 40 | 63.3 | 4.27 | | | | | |
| Springdale | 94 | 55 | 72.1 | 2.81 | Jacksonville | 88 | 39 | 62.3 | 7.45 | | | | | |
| Strawberry Plains† | ..... | ..... | 4.35 | Lunenburg* | 91 | 50 | 67.0 | 4.49 | | | | | | |
| Trenton | 87 | 53 | 73.9 | 6.74 | Strafford* | 84 | 48 | 65.7 | 3.85 | | | | | |
| Union City | 93 | 53 | 79.3 | 0.95 | Vernon | 90 | 52 | 65.1 | 4.84 | | | | | |

Meteorological record of voluntary observers, &c.—Continued.

| Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | Stations. | Temperature. (Fahrenheit.) | | | Precip'n. |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Max. | Min. | Mean | Max. | Min. | Mean | Max. | Min. | Mean |

<tbl_r cells="14" ix="5" maxcspan

Received too late to be used in general discussion for July, 1891.

| Stations. | Temperature. (Fahrenheit.) | | | Precip'n. | Stations. | Temperature. (Fahrenheit.) | | | Precip'n. |
|-----------------|-------------------------------|------|------|-----------|-------------------|-------------------------------|------|------|-----------|
| | Max. | Min. | Mean | | | Max. | Min. | Mean | |
| Alabama. | | | | | Nebraska. | | | | |
| Guntersville | 91 | 60 | 75.4 | 64.5 | Lincoln | 92 | 50 | 71.0 | 8.79 |
| Uniontown | 93 | 63 | 79.2 | 5.22 | North Dakota. | | | | |
| Alaska. | | | | | Kelso | 90 | 38 | 63.9 | 2.45 |
| Juneau | 88 | 39 | 60.4 | 2.37 | Oregon. | | | | |
| Killisnoo | 84 | 41 | 53.8 | 3.35 | Ashland (2) | 102 | 38 | 72.6 | 0.75 |
| Arizona. | | | | | Jordan Valley | 96 | 32 | 64.6 | 0.45 |
| Tempe | 112 | 62 | 90.0 | 0.45 | Texas. | | | | |
| California. | | | | | Corsicana (1) | | 64.7 | 82.2 | 0.60 |
| Bishop Creek | 105 | 67 | 85.6 | 0.00 | Panter | 105 | 70 | 79.4 | 3.36 |
| Borden. | 114 | 65 | 86.1 | 0.00 | Utah. | | | | |
| Chico | 117 | 60 | 87.5 | 0.15 | Lake Park | 95 | 42 | 71.1 | 0.66 |
| Fruto | 110 | 61 | 87.1 | 0.00 | West Virginia. | | | | |
| Julian | 102 | 41 | 75.0 | 0.00 | Kingwood | 88 | 50 | 64.8 | .... |
| Livingston | 112 | 63 | 90.2 | 0.00 | Wisconsin. | | | | |
| Los Banos | 108 | 60 | 85.0 | 0.00 | Guanajuato | 91 | 53 | 67.8 | 3.25 |
| Marysville | 100 | 65 | 88.3 | 0.10 | La Logia* | 102 | 78 | 90.6 | 1.08 |
| Newark | 93 | 58 | 69.1 | 0.00 | Leon de Aldemas | 90 | 54 | 71.6 | 2.64 |
| Norwalk | 112 | 60 | 79.1 | 0.00 | Mazatlan. | 92 | 77 | 85.8 | 2.73 |
| Palermo | 105 | 53 | 81.2 | 0.19 | Mexico | 81 | 50 | 63.4 | 5.46 |
| Sanger Junction | 119 | 60 | 91.6 | 0.00 | Pueblo | 79 | 47 | 63.7 | 13.80 |
| Florida. | | | | | Topolobampo | 92 | 81 | 87.7 | 1.97 |
| Archer | 100 | 63 | 81.5 | 4.86 | Vera Cruz. | 88 | 76 | 82.1 | 20.46 |
| Illinois. | | | | | West Indies. | | | | |
| Aurora (2) | | | | 2.76 | Grand Turk Island | | | | |
| Indiana. | | | | | Hamilton, Bermuda | 86 | 73 | 78.6 | 2.02 |
| Butterville* | | | | | | | | | |
| Iowa. | | | | | | | | | |
| Bonaparte* | 92 | 58 | 74.9 | 4.64 | | | | | |
| Keosauqua | 90 | 46 | 71.9 | .... |  |  |  |  |  |
| Missouri. | | | | | | | | | |
| Oak Ridge* | 95 | 58 | 78.5 | 0.20 | | | | | |

Letters of the alphabet denote the number of days missing from the record, thus:
the letter c indicates three days missing, etc., etc.

*Extremes of temperature from observed readings.

†Signal Service instruments.

‡One observation daily at 10 a. m.

Corrections: Colorado, May and June, 1891, read "Monte Vista (1)" instead of "Monte Vista (2)." California, June, 1891, Los Gatos (2), make mean temperature 63.9 instead of 70.0.

Data from Canadian stations for the month of July, 1891.

| Station. | Pressure. | | | Temperature. | Precipitation. | Prevailing direction of wind. |
|----------------------------|------------------------|---------------|---------------------------|--------------|----------------|----------------------------------|
| | Mean not re- duced, | Mean reduced, | Departure from normal. | | | |
| Saint Johns, N. F. | 29.96 | 30.10 | ..... | 54.4 | 0 | Inches. |
| Sydney, N. S. | 29.96 | 30.01 | + .11 | 59.9 | - 1.6 | 5.52 |
| Halifax, N. S. | 29.90 | 30.03 | + .10 | 62.0 | - 0.5 | 3.99 |
| Grand Manan, N. B. | 29.94 | 29.99 | ..... | 60.2 | ..... | 3.36 |
| Yarmouth, N. S. | 29.95 | 30.03 | + .10 | 58.0 | - 3.0 | 4.24 |
| Saint Andrews, N. B. | 29.92 | 29.97 | ..... | 59.0 | ..... | 3.14 |
| Charlottetown, P. E. I. | 29.94 | 29.98 | ..... | 63.3 | ..... | 3.01 |
| Chatham, N. B. | 29.94 | 29.96 | + .08 | 64.0 | + 1.0 | 5.70 |
| Father Point, Que. | 29.88 | 29.91 | + .07 | 57.7 | + 0.7 | 3.10 |
| Quebec, Que. | 29.61 | 29.93 | + .06 | 62.9 | - 2.1 | 5.56 |
| Montreal, Que. | 29.74 | 29.94 | + .06 | 64.8 | - 3.7 | 4.80 |
| Rockliffe, Ont. | 29.44 | 29.89 | ..... | 61.0 | - 2.0 | 4.99 |
| Kingston, Ont. | 29.65 | 29.96 | + .06 | 63.5 | - 4.5 | 5.21 |
| Toronto, Ont. | 29.60 | 29.98 | + .04 | 63.5 | - 4.0 | 2.16 |
| White River, Ont. | 28.65 | 29.98 | ..... | 54.0 | ..... | 3.90 |
| Port Stanley, Ont. | 29.38 | 30.01 | ..... | 64.0 | ..... | 2.58 |
| Saugeen, Ont. | 29.28 | 29.98 | + .05 | 61.2 | - 2.3 | 4.60 |
| Parry Sound, Ont. | 29.28 | 29.96 | + .04 | 62.6 | - 2.4 | 3.35 |
| Port Arthur, Ont. | 29.26 | 29.94 | + .06 | 58.8 | - 4.7 | 4.16 |
| Winnipeg, Man. | 29.18 | 29.99 | + .10 | 61.4 | - 2.6 | 1.94 |
| Minnedosa, Man. | 28.20 | 29.95 | + .12 | 59.8 | - 1.7 | 2.23 |
| Qu'Appelle, Assinibois. | 27.76 | 29.96 | + .10 | 60.0 | - 3.0 | 3.38 |
| Medicine Hat, Assinibois | 27.70 | 29.92 | + .08 | 68.5 | + 1.0 | 1.26 |
| Swift Current, Assinibois. | 27.46 | 29.97 | + .07 | 62.6 | - 1.9 | 3.36 |
| Calgary, Assinibois. | 26.45 | 29.89 | - .01 | 61.5 | + 2.5 | 2.81 |
| Prince Albert, Assinibois | 28.44 | 30.00 | ..... | 61.0 | ..... | 0.90 |
| Esquimalt, B. C. | | 30.02 | ..... | 60.0 | ..... | 0.02 |
| Port Moody, B. C. | 29.88 | 29.91 | - .05 | 63.7 | - 0.1 | 1.65 |
| St. Albans, Man. | 28.80 | 29.91 | + .06 | 63.4 | - 5.3 | 1.40 |
| Edmonton, Assinibois. | 27.62 | 29.89 | ..... | 61.7 | ..... | 6.63 |
| Grindstone, Gulf St. L. | 29.94 | 29.97 | ..... | 58.5 | ..... | 2.42 |
| Sandy Point, N. F. | 29.94 | 29.96 | ..... | 58.4 | ..... | 2.05 |
| Stony Mountain, Man. | | 29.91 | + .10 | 62.4 | - 3.6 | 2.91 |
| Hamilton, Bermuda | 30.03 | ..... | ..... | 78.8 | ..... | 4.52 |

MONTHLY WEATHER REVIEW.

JULY, 1891.

Table of miscellaneous meteorological data for July, 1891—Weather Bureau observations.

| Districts and stations. | Elevation above sea-level, feet. | Length of record, years. | Pressure, in inches. | | Temperature of the air, in degrees Fahrenheit. | | | | Humidity and precipitation. | | | | Wind. | | Mean temperature data since opening of station. | | | | | | | | | | | | | |
|-------------------------|----------------------------------|--------------------------|--|---------------------------|--|---------------------------|-------------------|------------------------|-----------------------------|--------------------------|---------------------------------------|---|------------------------------|-----------------------------|---|----------------------|-------|-----------------|---------------------|--------------|---------------------|-----------------------|-------|----------------------|-------|------|------|------|
| | | | Mean pressure, 8 a.m. and 8 p.m. + 2. Mean reduced. | Departure from normal. | Mean max. and min. + 2. | Departure from normal. | Maximum. Date. | Mean maximum. Date. | Minimum. Date. | Greatest daily range. | Mean temperature of the dew-point. | Mean relative humidity, per cent. | Precipitation, in inches. | Total move- ment, miles. | Prevailing direc- tion. | Maximum velocity. | Date | Cloudless days. | Partly cloudy days. | Cloudy days. | Average cloudiness, | Highest for month. | Year. | Lowest for month. | Year. | | | |
| New England. | | | | | 55.6 — 5.2 | | | | | | | | | | | | | | | | | | | | | | | |
| Eastport. | 53 | 10 | 29.92 | 29.98 + .06 | 57.8 — 2.6 | 77 | 10 | 65 | 46 | * | 50 | 51 | 2.61 | 12 | 4,660 | s. | se. | 15 | 3 | 13 | 10 | 5.8 | 62 | * | 58 | 1891 | | |
| Green Mountain. | | | 26.42 | 30.03 | 61.7 — 3.2 | 82 | 14 | 67 | 51 | 24 | 56 | 52 | 5.95 | 8 | 5,959 | s. | sw. | 31 | 15 | 13 | 10 | 4.8 | 72 | 1876 | 65 | 1891 | | |
| Portland. | 99 | 20 | 29.88 | 29.98 + .06 | 65.0 — 3.0 | 91 | 14 | 72 | 52 | 26 | 56 | 51 | 4.78 | 1 | 1 | 14 | 10 | 13 | 9 | 14 | 11 | 10 | 4.6 | 72 | 1887 | 45 | 1884 | |
| Manchester. | 247 | 5 | 29.75 | 30.00 | 67.0 — 2.7 | 90 | 14 | 78 | 46 | 28 | 57 | 54 | 3.14 | 0.5 | 10 | 3,345 | uw. | 19 | 5 | 5 | 5 | 5.8 | 70 | 1877 | 68 | 1890 | | |
| Mt. Killington. | | | | | 52.0 — 2.7 | 71 | 14 | 58 | 34 | 31 | 46 | 56 | 4.2 | 86 | 5.77 | 17 | 12 | 14 | 11 | 11 | 9 | 4.9 | 75 | 1872 | 65 | 1884 | | |
| Mt. Washington. | 21 | 23 | 29.90 | 30.00 + .07 | 63.0 — 2.8 | 64 | 13 | 52 | 29 | 31 | 40 | 22 | 4.2 | 86 | 6.22 | 2 | 7 | 13 | 15 | 15 | 11 | 5.2 | 70 | 1877 | 65 | 1891 | | |
| Northfield. | 672 | 5 | 29.97 | 29.98 | 63.0 — 2.8 | 67 | 14 | 74 | 40 | 27 | 61 | 57 | 3.58 | 0.1 | 10 | 6,600 | sw. | 30 | 15 | 10 | 12 | 6.4 | 72 | 1876 | 65 | * | | |
| Boston. | 125 | 21 | 29.89 | 30.03 + .06 | 64.6 — 2.8 | 78 | 17 | 70 | 56 | 28 | 61 | 57 | 2.18 | 1.2 | 11 | 8,725 | se. | 45 | 7 | 9 | 11 | 5.9 | 71 | 1887 | 67 | 1888 | | |
| Nantucket. | 14 | 5 | 30.03 | 30.04 | 65.4 — 2.7 | 76 | 21 | 71 | 54 | 1 | 59 | 17 | 2.58 | 0.2 | 13 | 8,765 | sw. | 36 | 10 | 11 | 10 | 5.1 | 74 | 1887 | 72 | 1884 | | |
| Woods Hole. | | | | | 65.1 — 2.7 | 83 | 21 | 70 | 53 | 3 | 60 | 15 | 61 | 0.90 | 10 | 6,600 | w. | 28 | 6 | 10 | 9 | 12 | 5.7 | 77 | 1876 | 68 | 1891 | |
| Vineyard Haven. | 22 | 14 | | | 65.0 — 2.7 | 79 | 21 | 70 | 53 | 3 | 60 | 29 | 60 | 7.73 | 0.1 | 10 | 7,627 | sw. | 4 | 8 | 11 | 12 | 6.0 | 75 | 1876 | 67 | 1891 | |
| Block Island. | 27 | 11 | 30.02 | 30.04 + .07 | 65.0 — 2.7 | 85 | 25 | 76 | 50 | 29 | 59 | 29 | 60 | 7.45 | 0.1 | 10 | 6,600 | sw. | 26 | 15 | 10 | 12 | 6.4 | 72 | 1876 | 65 | * | |
| Narragansett Pier. | 23 | 10 | 29.90 | 30.01 + .04 | 66.6 — 4.2 | 84 | 21 | 73 | 54 | 1 | 60 | 23 | 60 | 8.73 | 0.1 | 10 | 8,725 | se. | 45 | 7 | 9 | 11 | 5.9 | 71 | 1887 | 68 | 1891 | |
| New Haven. | 107 | 19 | 29.90 | 30.02 + .05 | 66.6 — 4.2 | 84 | 21 | 73 | 54 | 1 | 60 | 23 | 60 | 8.35 | 0.2 | 13 | 8,765 | sw. | 36 | 10 | 11 | 10 | 5.1 | 74 | 1887 | 72 | 1884 | |
| New London. | 47 | 21 | 29.97 | 30.02 + .05 | 66.6 — 4.2 | 84 | 21 | 73 | 54 | 1 | 60 | 23 | 60 | 8.07 | 0.1 | 10 | 8,725 | se. | 45 | 7 | 9 | 11 | 5.9 | 71 | 1887 | 68 | 1891 | |
| Mid. Atlantic States. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Albany. | 85 | 18 | 29.91 | 30.00 | 69.1 — 3.9 | 91 | 13 | 78 | 50 | 31 | 60 | 29 | 59 | 7.6 | 1.1 | 18 | 5,135 | s. | 24 | 3 | 5 | 5 | 5.1 | 77 | 1887 | 69 | 1891 | |
| New York, N. Y. | 185 | 20 | 29.83 | 30.00 + .04 | 70.5 — 3.0 | 89 | 15 | 78 | 58 | 21 | 64 | 51 | 7.05 | 0.5 | 15 | 7,051 | s. | 31 | 5 | 10 | 10 | 5.2 | 77 | 1887 | 70 | 1891 | | |
| Harrisburg. | 377 | 4 | 29.63 | 30.03 | 70.5 — 3.0 | 89 | 15 | 79 | 52 | 5 | 61 | 30 | 72 | 8.40 | 4.2 | 14 | 4,549 | w. | 36 | 4 | 10 | 11 | 5.1 | 74 | 1887 | 72 | 1884 | |
| Philadelphia. | 117 | 21 | 29.91 | 30.03 | 71.9 — 4.1 | 89 | 15 | 80 | 54 | 9 | 9 | 68 | 7.1 | 4.55 | 0.1 | 13 | 6,978 | sw. | 31 | 10 | 9 | 12 | 5.8 | 80 | 1887 | 72 | 1884 | |
| Atlantic City. | 53 | 18 | 29.99 | 30.04 + .06 | 71.9 — 4.1 | 89 | 15 | 81 | 52 | 11 | 60 | 49 | 7.05 | 0.3 | 15 | 7,757 | s. | 36 | 10 | 14 | 7 | 5.2 | 75 | 1887 | 69 | 1891 | | |
| New Brunswick. | | | | | 69.9 — 3.4 | 92 | 12 | 74 | 52 | 11 | 60 | 49 | 7.05 | 0.3 | 13 | 7,757 | s. | 36 | 12 | 18 | 11 | 5.1 | 77 | 1887 | 69 | * | | |
| Baltimore. | 179 | 21 | 29.84 | 30.03 + .05 | 71.6 — 7.0 | 89 | 14 | 80 | 55 | 8 | 63 | 29 | 63 | 7.40 | 0.3 | 16 | 5,081 | nw. | 34 | 11 | 12 | 13 | 5.2 | 82 | 1887 | 73 | 1891 | |
| Washington, D. C. | 112 | 21 | 29.93 | 30.04 + .05 | 72.0 — 5.6 | 89 | 15 | 81 | 54 | 8 | 63 | 29 | 63 | 6.92 | 1.1 | 13 | 2,812 | sw. | 20 | 13 | 10 | 8 | 4.7 | 82 | 1876 | 75 | 1891 | |
| Lynchburg. | 685 | 18 | 29.34 | 30.06 + .06 | 72.2 — 5.3 | 89 | 15 | 83 | 55 | 11 | 60 | 24 | 68 | 8.00 | 0.2 | 19 | 6,103 | sw. | 18 | 12 | 11 | 8 | 4.7 | 82 | 1876 | 75 | 1891 | |
| Norfolk. | 43 | 21 | 30.01 | 30.05 + .04 | 72.5 — 4.1 | 91 | 7 | 83 | 59 | 11 | 67 | 24 | 68 | 8.25 | 0.1 | 19 | 6,103 | sw. | 41 | 7 | 2 | 13 | 14 | 6.4 | 85 | 1874 | 70 | 1874 |
| S. Atlantic States. | | | | | 72.5 — 4.1 | 92 | 7 | 83 | 59 | 11 | 67 | 24 | 68 | 8.50 | 0.1 | 19 | 6,103 | sw. | 30 | 7 | 2 | 13 | 14 | 6.4 | 85 | 1874 | 70 | 1874 |
| Charlotte. | 773 | 13 | 29.25 | 30.05 + .02 | 76.2 — 1.7 | 89 | 15 | 80 | 51 | 21 | 61 | 25 | 65 | 7.65 | 0.5 | 18 | 8,713 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 83 | 1881 | 75 | 1888 |
| Hatteras. | 11 | 11 | 30.07 | 30.09 + .05 | 76.2 — 1.7 | 89 | 15 | 81 | 52 | 21 | 61 | 25 | 65 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1881 | 75 | 1881 |
| Kitty Hawk. | 17 | 17 | 29.03 | 30.04 | 75.1 — 3.6 | 89 | 15 | 82 | 53 | 21 | 61 | 25 | 66 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1880 | 75 | 1891 |
| Raleigh. | 358 | 5 | 29.60 | 30.06 | 75.4 — 4.7 | 89 | 15 | 83 | 54 | 21 | 61 | 25 | 66 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1880 | 75 | 1891 |
| Southport. | | | | | 75.4 — 4.7 | 92 | 15 | 84 | 55 | 21 | 61 | 25 | 66 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1880 | 75 | 1891 |
| Wilmington. | 78 | 21 | 29.99 | 30.07 + .03 | 75.4 — 2.5 | 89 | 15 | 85 | 56 | 21 | 61 | 25 | 66 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1880 | 75 | 1891 |
| Charleston. | 52 | 21 | 30.03 | 30.07 + .03 | 75.4 — 2.5 | 89 | 15 | 86 | 57 | 21 | 61 | 25 | 66 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1880 | 75 | 1891 |
| Columbia. | 5 | 20 | 29.87 | 30.09 + .05 | 75.0 — 4.2 | 89 | 15 | 87 | 58 | 21 | 61 | 25 | 66 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1880 | 75 | 1891 |
| Augusta. | 209 | 20 | 29.87 | 30.09 + .05 | 75.0 — 4.2 | 89 | 15 | 88 | 59 | 21 | 61 | 25 | 66 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1880 | 75 | 1891 |
| Savannah. | 87 | 21 | 30.00 | 30.09 + .04 | 75.9 — 3.3 | 89 | 15 | 89 | 60 | 21 | 61 | 25 | 66 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1880 | 75 | 1891 |
| Jacksonville. | 43 | 20 | 30.04 | 30.09 + .04 | 75.9 — 1.4 | 92 | 15 | 90 | 61 | 21 | 61 | 25 | 66 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1880 | 75 | 1891 |
| Morristown Peninsula. | | | | | 75.9 — 1.4 | 92 | 15 | 91 | 62 | 21 | 61 | 25 | 66 | 8.50 | 0.5 | 18 | 9,766 | sw. | 50 | 7 | 2 | 10 | 11 | 6.4 | 82 | 1880 | 75 | 1891 |
| Jupiter. | 38 | 4 | 30.06 | 30.09 + .03 | 80.3 | | | | | | | | | | | | | | | | | | | | | | | |

Table of miscellaneous meteorological data for July, 1891—Weather Bureau observations—Continued.

| Districts and stations. | Elevation above sea-level, feet. | Length of record, years. | Pressure, in inches. | | Temperature of the air, in degrees Fahrenheit. | | | | | | | | Humidity and precipitation. | | | | Wind. | | | | Mean temperature data since opening of station. | | | | | | | | | | | | |
|----------------------------|----------------------------------|--------------------------|---------------------------------------|---------------|--|-------------------------|------------------------|----------|-------|----------|-------|---------------|-----------------------------|---------------|-----------------------------------|---------------------------|------------------------|-----------------------|-----------------------------------|-----------------|---|--------------|-----------------------------|--------------------|-------|-------------------|-------|-------|-------|-------|-------|------|------|
| | | | Mean pressure, 8 a.m. and 8 p.m. + 2. | Mean reduced. | Departure from normal. | Mean max. and min. + 2. | Departure from normal. | Maximum. | Date. | Minimum. | Date. | Mean maximum. | Greatest daily range. | Mean minimum. | Mean relative humidity, per cent. | Precipitation, in inches. | Total movement, miles. | Prevailing direction. | Maximum velocity, Miles per hour. | Cloudless days. | Partly cloudy days. | Cloudy days. | Average cloudiness, tenths. | Highest for month. | Year. | Lowest for month. | Year. | | | | | | |
| <i>Up Lakes Reg.—Con.</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Green Bay..... | 617 | 5 | 29.36 | 30.02 | ..... | 65.5 | ..... | 90 | 13 | 77 | 44 | 9 | 54 | 34 | 52 | 66 | 1.80 | ..... | 12 | 5,823 | s. | sw. | 13 | 8 | 16 | 7 | 5.5 | 74 | 1887 | 66 | 1891 | | |
| Duluth..... | 656 | 21 | 29.29 | 29.99 | + .07 | 61.3 | — 5.4 | 84 | 15 | 70 | 47 | * | 53 | 28 | 51 | 71 | 3.82 | — 0.2 | 13 | 4,613 | n. | nw. | 16 | 15 | 7 | 9 | 5.0 | 71 | 1878 | 61 | 1891 | | |
| <i>Extreme Northwest.</i> | | | | | | 63.4 | — 5.4 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Moorhead..... | 935 | 11 | 28.98 | 29.97 | + .06 | 63.4 | — 4.5 | 83 | 11 | 75 | 42 | 18 | 52 | 33 | 55 | 73 | 3.57 | — 0.7 | 12 | 5,764 | n. | sw. | 20 | 17 | 8 | 6 | 3.6 | 71 | 1881 | 63 | 1891 | | |
| Saint Vincent..... | 804 | 11 | 29.13 | 30.01 | + .10 | 61.0 | — 4.2 | 81 | 28 | 73 | 37 | 19 | 49 | 38 | ..... | ..... | 2.50 | — 0.3 | 11 | 5,647 | n. | e. | 12 | 14 | 8 | 9 | 4.5 | 69 | 1886 | 61 | 1894 | | |
| Bismarck..... | 1,598 | 17 | 28.20 | 29.97 | + .07 | 64.8 | — 5.6 | 86 | 5 | 76 | 41 | 24 | 54 | 32 | 55 | 73 | 4.20 | — 1.0 | 13 | 5,687 | nw. | ne. | 11 | 7 | 17 | 7 | 5.4 | 75 | 1886 | 64 | 1894 | | |
| Fort Buford..... | 1,900 | 13 | 27.99 | 29.95 | + .10 | 64.6 | — 5.6 | 84 | 5 | 75 | 43 | 24 | 54 | 31 | 55 | 72 | 2.93 | — 1.0 | 10 | 5,855 | e. | sw. | 5 | 13 | 12 | 6 | 4.4 | 70 | 1886 | 64 | 1894 | | |
| <i>Upper Miss. Valley.</i> | | | | | | 70.0 | — 5.0 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minneapolis..... | 758 | ..... | 29.19 | 29.99 | ..... | 66.4 | — 5.4 | 84 | 31 | 76 | 44 | 7 | 56 | 28 | ..... | 2.99 | — 0.1 | 13 | ..... | ..... | ..... | ..... | 9 | 15 | 7 | ..... | ..... | ..... | ..... |  |  |  |  |
| Red Wing..... | 758 | ..... | 29.19 | 29.99 | ..... | 65.9 | — 5.4 | 84 | 22 | 76 | 46 | 8 | 56 | 31 | 56 | 69 | 2.50 | — 0.2 | 10 | 4,721 | w. | sw. | 23 | 21 | 9 | 15 | 7 | 4.9 | ..... | ..... | ..... |  |  |
| Saint Paul..... | 831 | 21 | 29.12 | 30.00 | + .07 | 65.7 | — 6.3 | 84 | 31 | 76 | 47 | 7 | 56 | 27 | 55 | 71 | 2.07 | — 1.2 | 9 | 4,948 | se. | sw. | 22 | 17 | 8 | 5.6 | 75 | 1874 | 66 | 1891 | | | |
| La Crosse..... | 736 | 19 | 29.26 | 30.03 | + .08 | 66.8 | — 6.5 | 87 | 12 | 78 | 47 | 8 | 56 | 30 | 59 | 73 | 2.92 | — 1.6 | 10 | 5,503 | s. | sw. | 22 | 20 | 2 | 4.9 | 77 | 1874 | 67 | 1891 | | | |
| Davenport..... | 613 | 17 | 29.39 | 30.03 | + .04 | 66.2 | — 6.0 | 86 | 5 | 76 | 41 | 24 | 54 | 32 | 55 | 64 | 3.29 | — 0.5 | 7 | 5,724 | nw. | sw. | 13 | 14 | 15 | 2 | 3.7 | 75 | 1886 | 65 | 1891 | | |
| Des Moines..... | 869 | 13 | 29.11 | 30.02 | + .05 | 68.6 | — 6.4 | 88 | 12 | 79 | 49 | 9 | 56 | 30 | 60 | 74 | 2.78 | — 0.7 | 10 | 4,990 | nw. | sw. | 10 | 5 | 15 | 8 | 5.4 | 75 | 1886 | 65 | 1891 | | |
| Dubuque..... | 651 | 17 | 29.33 | 30.03 | + .05 | 68.8 | — 5.5 | 89 | 12 | 79 | 49 | 9 | 59 | 27 | 59 | 73 | 4.59 | — 0.8 | 8 | 1,960 | n. | sw. | 22 | 20 | 7 | 10 | 4.3 | 78 | 1874 | 69 | 1891 | | |
| Keokuk..... | 613 | 20 | 29.38 | 30.02 | + .05 | 70.6 | — 6.6 | 89 | 12 | 80 | 52 | 9 | 61 | 27 | 60 | 70 | 2.77 | — 1.5 | 8 | 3,900 | nw. | sw. | 27 | 22 | 15 | 13 | 3.8 | 82 | 1878 | 71 | 1891 | | |
| Cairo..... | 359 | 21 | 29.67 | 30.05 | + .06 | 74.8 | — 4.2 | 90 | 21 | 83 | 57 | 9 | 66 | 22 | 64 | 71 | 2.21 | — 1.4 | 8 | 4,426 | s. | sw. | 6 | 12 | 14 | 5 | 4.6 | 82 | 1875 | 75 | 1891 | | |
| Springfield, Ill..... | 644 | 13 | 29.35 | 30.03 | + .03 | 71.0 | — 6.2 | 89 | 12 | 81 | 49 | 9 | 61 | 29 | 57 | 64 | 4.44 | — 2.1 | 7 | 5,498 | nw. | sw. | 17 | 13 | 14 | 4 | 4.4 | 81 | 1879 | 71 | 1891 | | |
| Saint Louis..... | 571 | 21 | 29.43 | 30.03 | + .04 | 74.0 | — 4.6 | 91 | 21 | 84 | 55 | 9 | 66 | 25 | 60 | 64 | 1.50 | — 2.0 | 6 | 5,773 | nw. | sw. | 17 | 14 | 15 | 2 | 3.7 | 84 | 1887 | 74 | 1891 | | |
| <i>Missouri Valley.</i> | | | | | | 70.2 | — 5.3 | 80 | | | | | | | | 2.88 | — 0.9 | ..... | ..... | ..... | ..... | ..... | 9 | 15 | 7 | ..... | ..... | ..... | ..... |  |  |  |  |
| Columbia..... | 963 | 4 | 29.02 | 30.02 | + .05 | 72.4 | — 5.6 | 90 | 30 | 85 | 47 | 15 | 60 | 34 | ..... | 3.74 | — 0.1 | 9 | 3,686 | nw. | sw. | 22 | 11 | 15 | 5 | 4.8 | 80 | 1890 | 72 | 1891 | | | |
| Kansas City..... | 3,350 | 28 | 63 | 30.02 | + .03 | 72.2 | — 6.3 | 91 | 22 | 82 | 53 | 9 | 63 | 26 | 62 | 70 | 5.21 | — 0.7 | 12 | 5,165 | se. | sw. | 2 | 17 | 7 | 5.3 | 80 | 1888 | 72 | 1891 | | | |
| Topeka..... | 842 | ..... | ..... | ..... | ..... | 72.0 | — 6.0 | 92 | 22 | 83 | 50 | 9 | 62 | 28 | 60 | 86 | 0.66 | — 0.7 | 16 | ..... | s. | sw. | 23 | 5 | 21 | 5 | 4.8 | 80 | 1890 | 68 | 1891 | | |
| Omaha..... | 1,113 | 21 | 28.87 | 30.04 | + .07 | 71.2 | — 5.9 | 90 | 12 | 82 | 51 | 8 | 63 | 27 | 60 | 71 | 3.54 | — 1.8 | 15 | 5,282 | se. | sw. | 30 | n. | 13 | 8 | 15 | 8 | 5.4 | 80 | 1874 | 71 | 1891 |
| Crete..... | 5 | ..... | ..... | ..... | ..... | 71.1 | — 5.9 | 90 | 12 | 81 | 47 | 8 | 61 | 32 | 60 | 6.36 | — 0.8 | 14 | ..... | se. | sw. | 34 | 5 | 24 | 2 | 4.8 | 73 | 1889 | 07 | 1891 | | | |
| Valentine..... | 2,613 | 6 | 27.34 | 29.99 | | 67.8 | — 5.3 | 84 | 12 | 78 | 44 | 8 | 57 | 29 | 56 | 70 | 4.29 | — 1.2 | 12 | 6,886 | s. | sw. | 34 | ne. | 10 | 11 | 12 | 8 | 4.9 | 80 | 1887 | 07 | 1891 |
| Sioux City..... | 1,158 | 20 | 28.79 | 30.00 | | 69.2 | — 5.8 | 88 | 29 | 80 | 47 | 8 | 58 | 32 | 58 | 72 | 5.77 | — 0.7 | 14 | 6,470 | se. | sw. | 46 | ne. | 20 | 12 | 11 | 5 | 5.9 | 84 | 1886 | 66 | 1891 |
| Pierre..... | 2,523 | 17 | 28.44 | 29.95 | | 70.8 | — 4.3 | 90 | 20 | 83 | 46 | 9 | 59 | 38 | 54 | 61 | 1.21 | — 1.0 | 11 | 9,354 | s. | sw. | 20 | 6 | 14 | 11 | 5 | 9 | 84 | 1875 | 63 | 1891 | |
| Huron..... | 1,310 | 11 | 28.60 | 29.97 | + .03 | 67.2 | — 5.0 | 90 | 12 | 79 | 41 | 24 | 55 | 33 | 55 | 68 | 1.01 | — 2.9 | 8 | 5,727 | se. | sw. | 44 | n. | 13 | 11 | 17 | 3 | 4.4 | 74 | 1886 | 66 | 1892 |
| Yankton..... | 1,280 | 19 | 28.64 | 29.97 | + .03 | 66.6 | — 4.8 | 86 | 16 | 80 | 46 | 8 | 59 | 33 | 59 | 74 | 3.27 | — 0.1 | 13 | 7,916 | s. | sw. | 50 | n. | 21 | 9 | 13 | 9 | 5.3 | 78 | 1874 | 69 | 1892 |
| <i>Northern Slope.</i> | | | | | | 70.0 | — 5.0 | 80 | | | | | | | | 2.88 | — 0.7 | ..... | ..... | ..... | ..... | ..... |  |  |  |  |  |  |  |  |  |  |  |
| Fort Assiniboine..... | 2,690 | 11 | 27.18 | 29.94 | + .06 | 66.4 | — 1.5 | 89 | 5 | 78 | 47 | 23 | 55 | 33 | 51 | 63 | 4.68 | — 2.5 | 12 | 6,672 | e. | sw. | 36 | ne. | 11 | 11 | 15 | 5 | 4.6 | 74 | 1886 | 64 | 1891 |
| Fort Custer o..... | 3,040 | 11 | 26.82 | 29.91 | + .02 | 66.4 | — 5.0 | 90 | 20 | 78 | 48 | 12 | 55 | 34 | 50 | 61 | 0.60 | — 0.5 | 6 | 2,709 | sw. | sw. | 38 | n. | 12 | 5 | 24 | 76 | 1886 | 68 | 1891 | | |
| Rapid City..... | 3,280 | 6 | 26.66 | 29.93 | + .02 | 68.4 | — 4.3 | 94 | 12 | 82 | 49 | 14 | 56 | 36 | 50 | 55 | 2.09 | — 0.2 | 11 | 6,624 | se. | sw. | 57 | n. | 5 | 19 | 3 | 4.6 | 74 | 1890 | 68 | 1891 | |
| Cheyenne..... | 6,105 | 21 | 24.13 | 29.95 | + .09 | 65.0 | — 3.4 | 87 | 21 | 78 | 44 | 8 | 54 | 38 | 45 | 59 | 0.82 | — 1.0 | 8 | 7,049 | s. | sw. | 34 | w. | 20 | 12 | 12 | 2 | 4.7 | 70 | 1876 | 63 | 1891 |
| Fort McKinney..... | 5,000 | 4 | 25.10 | 29.97 | ..... | 65.2 | — 5.0 | 84 | 12 | 76 | 44 | 13 | 54 | 31 | 52 | 60 | 1.1 | | | | | | | | | | | | | | | | |

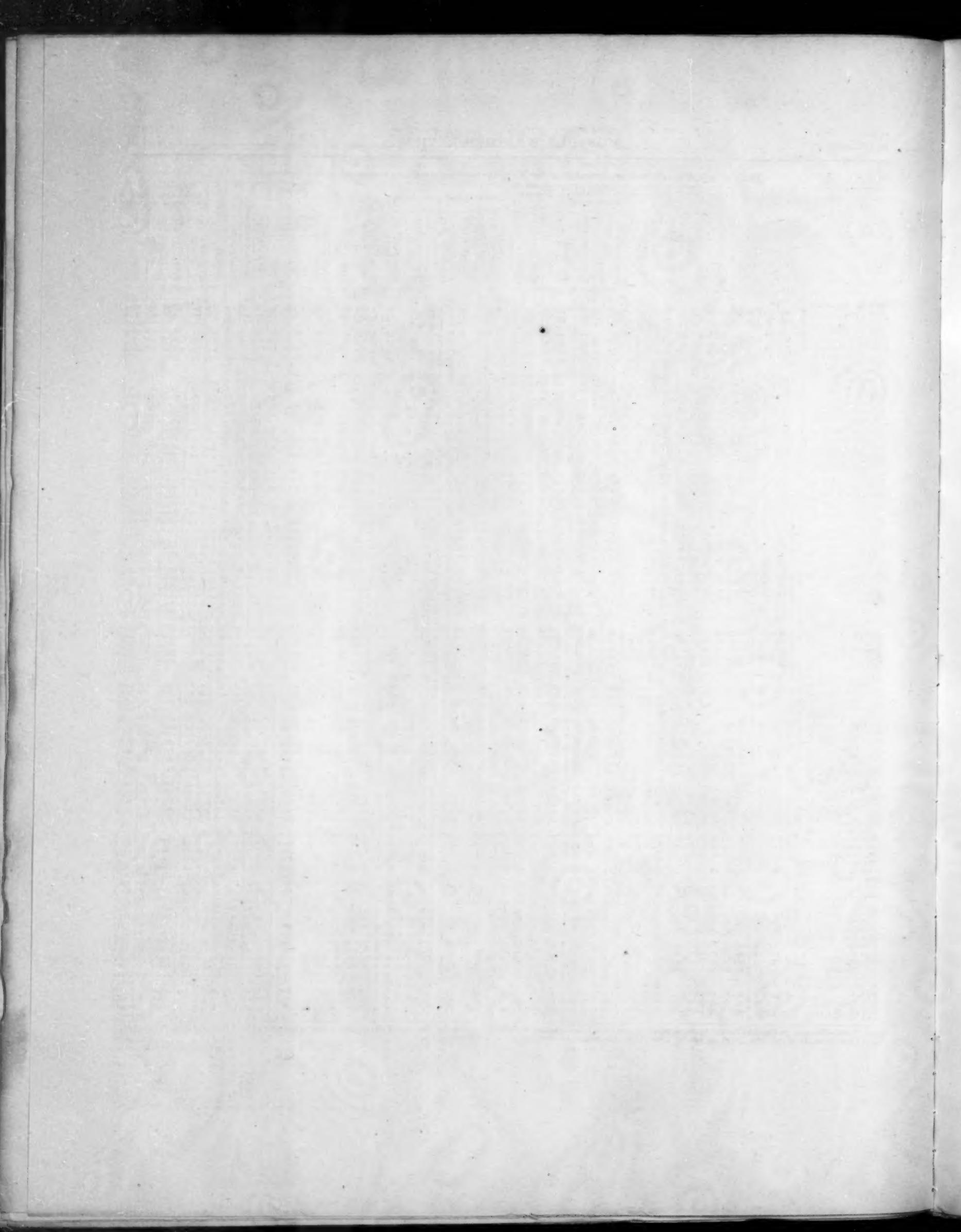


Chart I. Tracks

Form Map Q-1801.

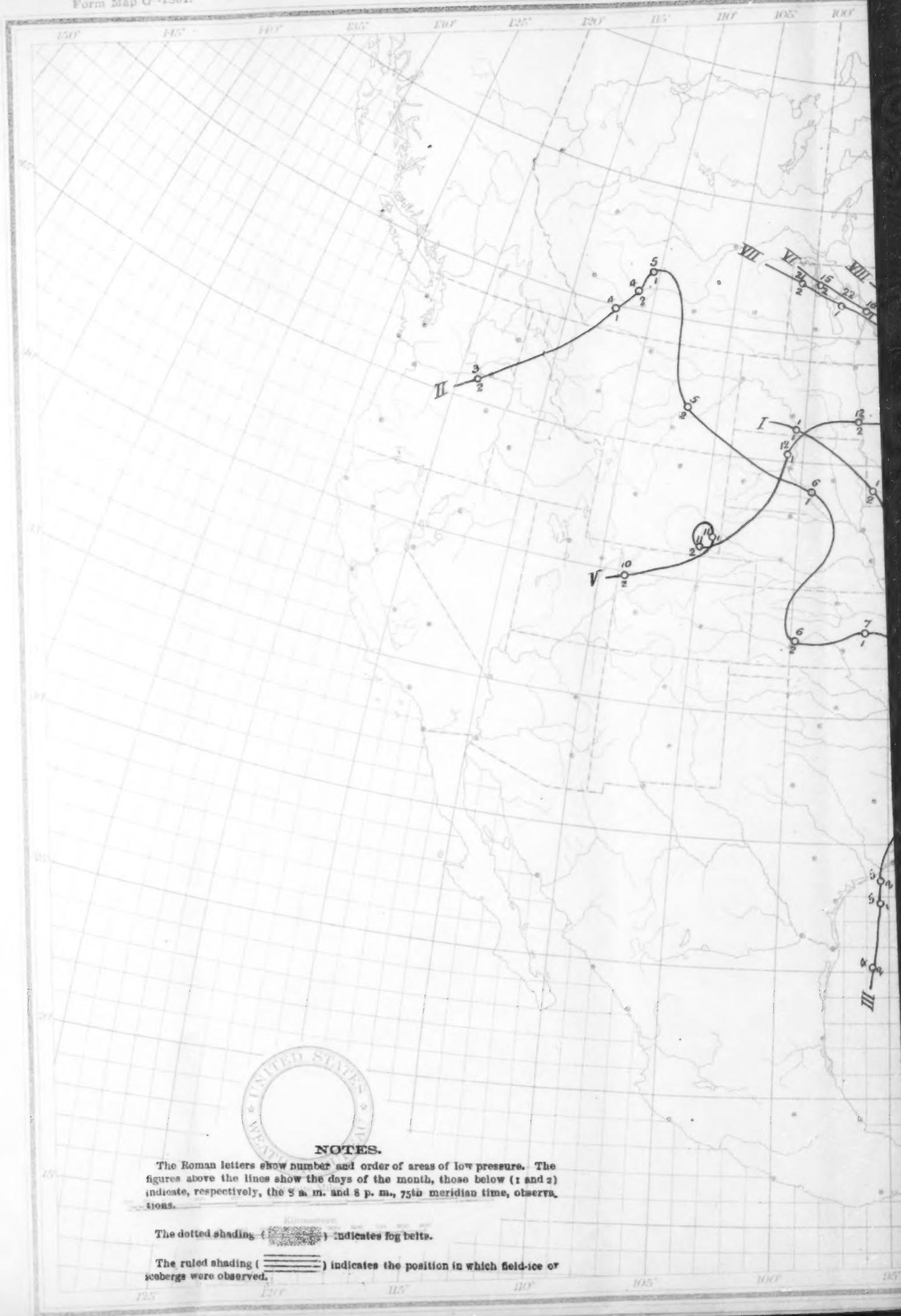
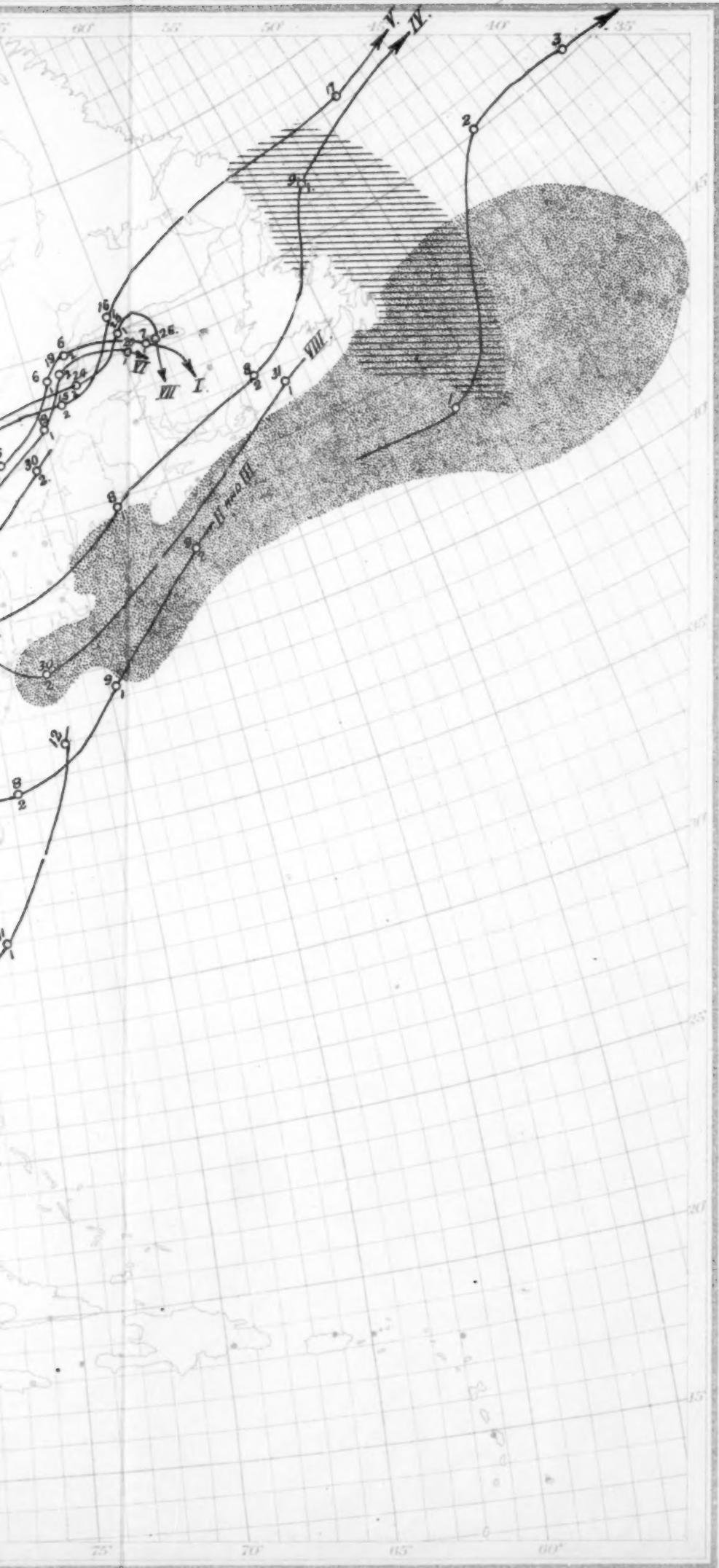


Chart I. Tracks of Areas of Low Pressure. July, 1891.





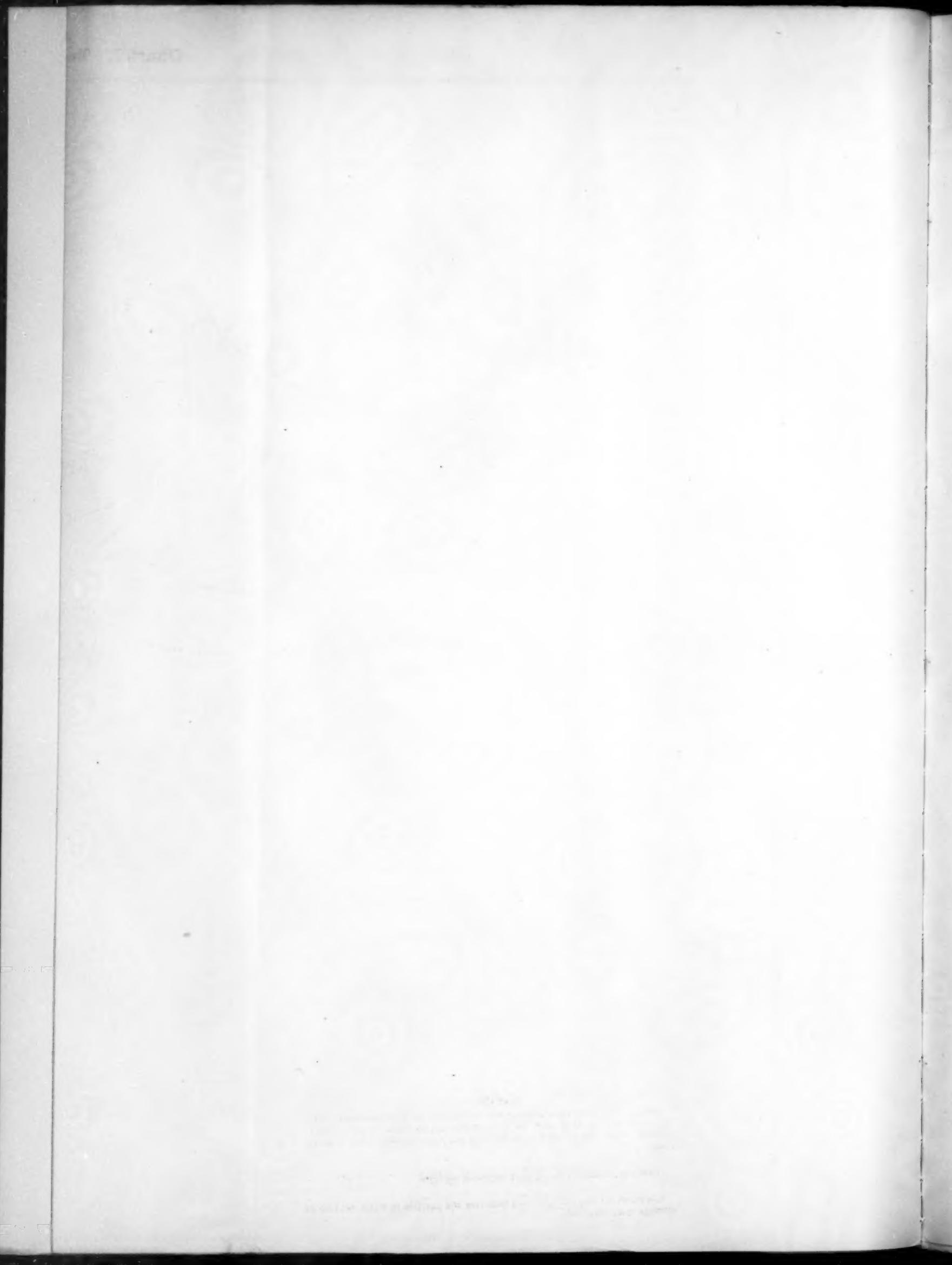


Chart II. Isotherms, Isohyps, and Winds, July, 1891.

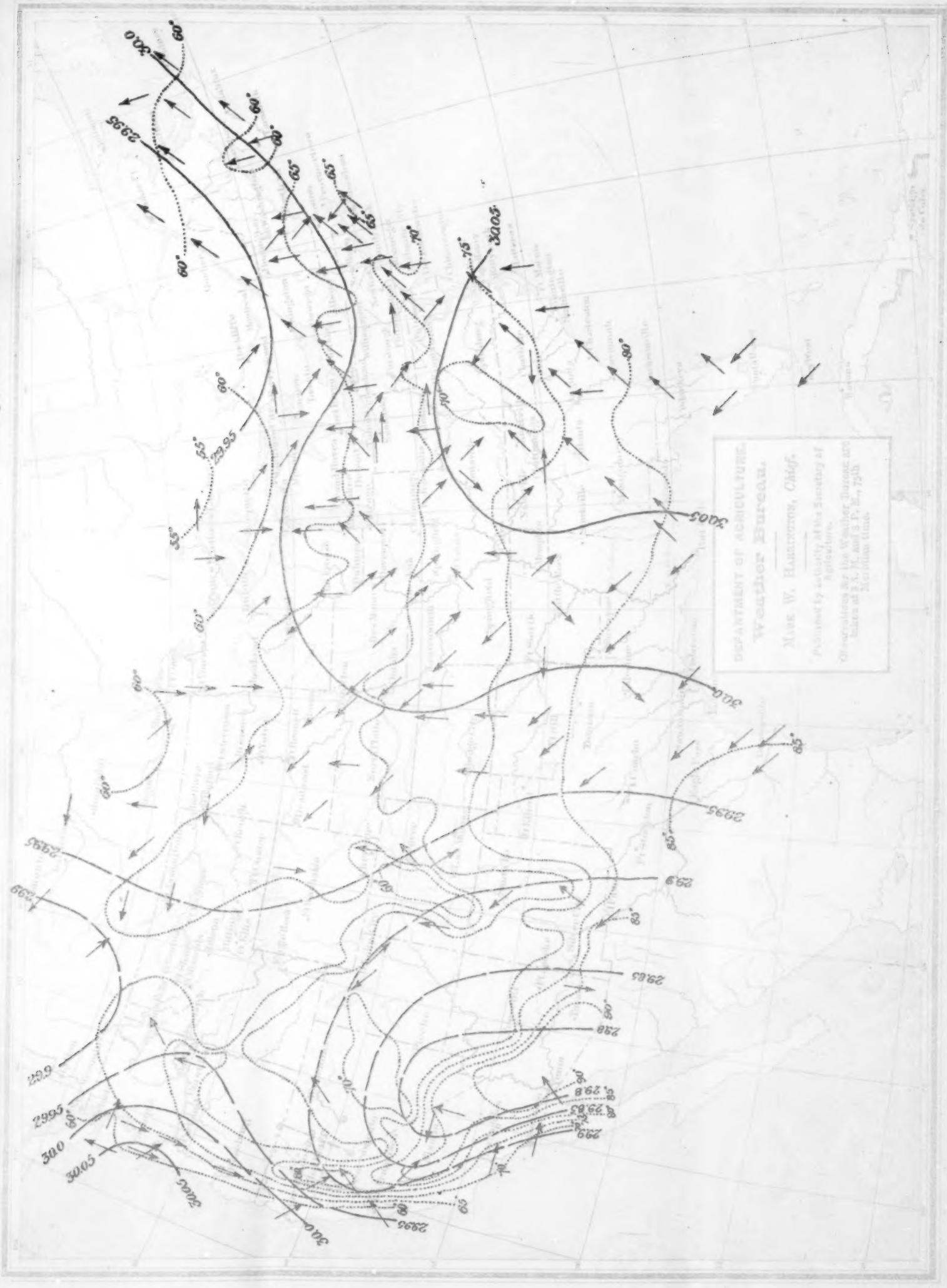


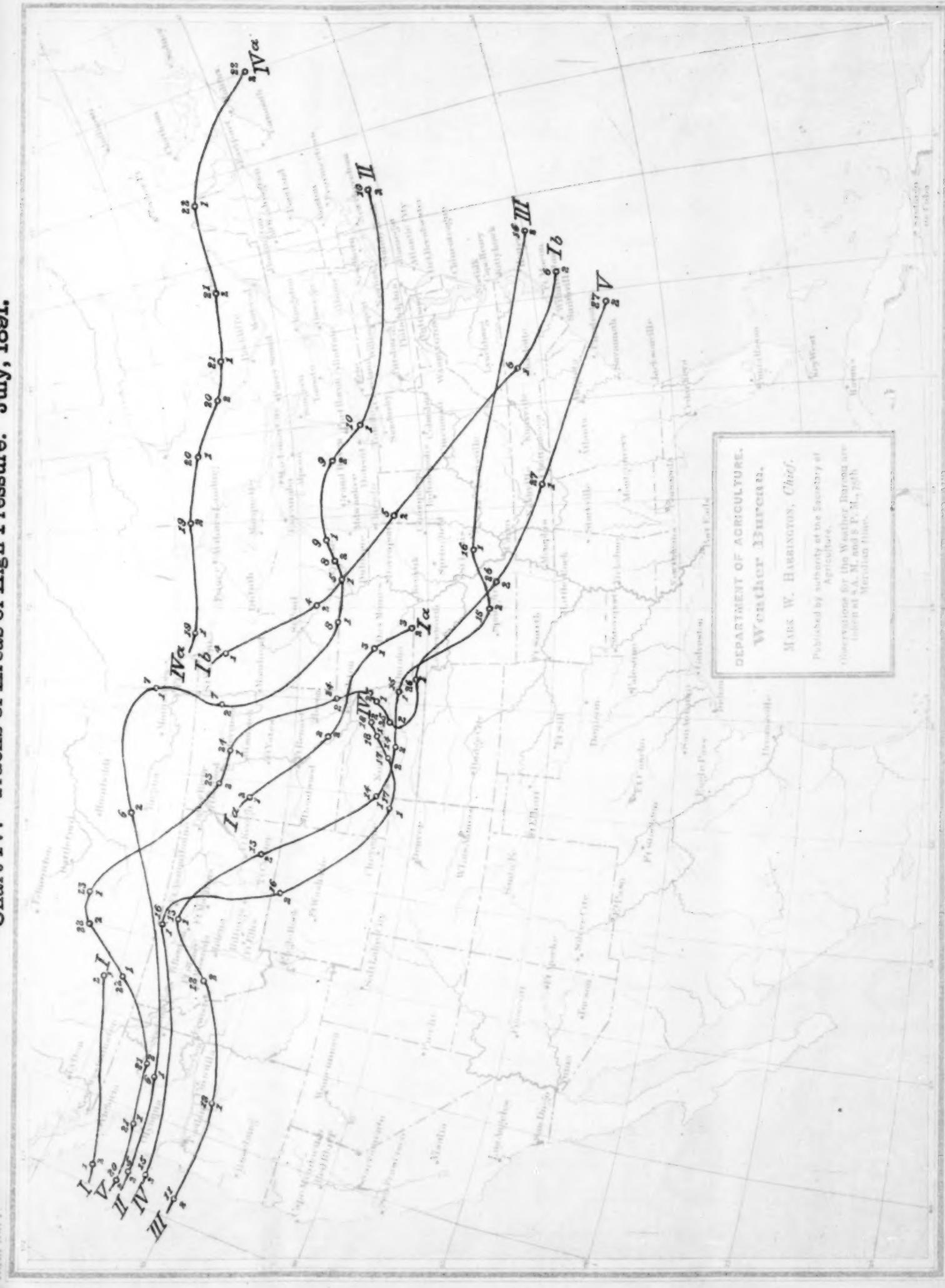
Chart III Precipitation 1860

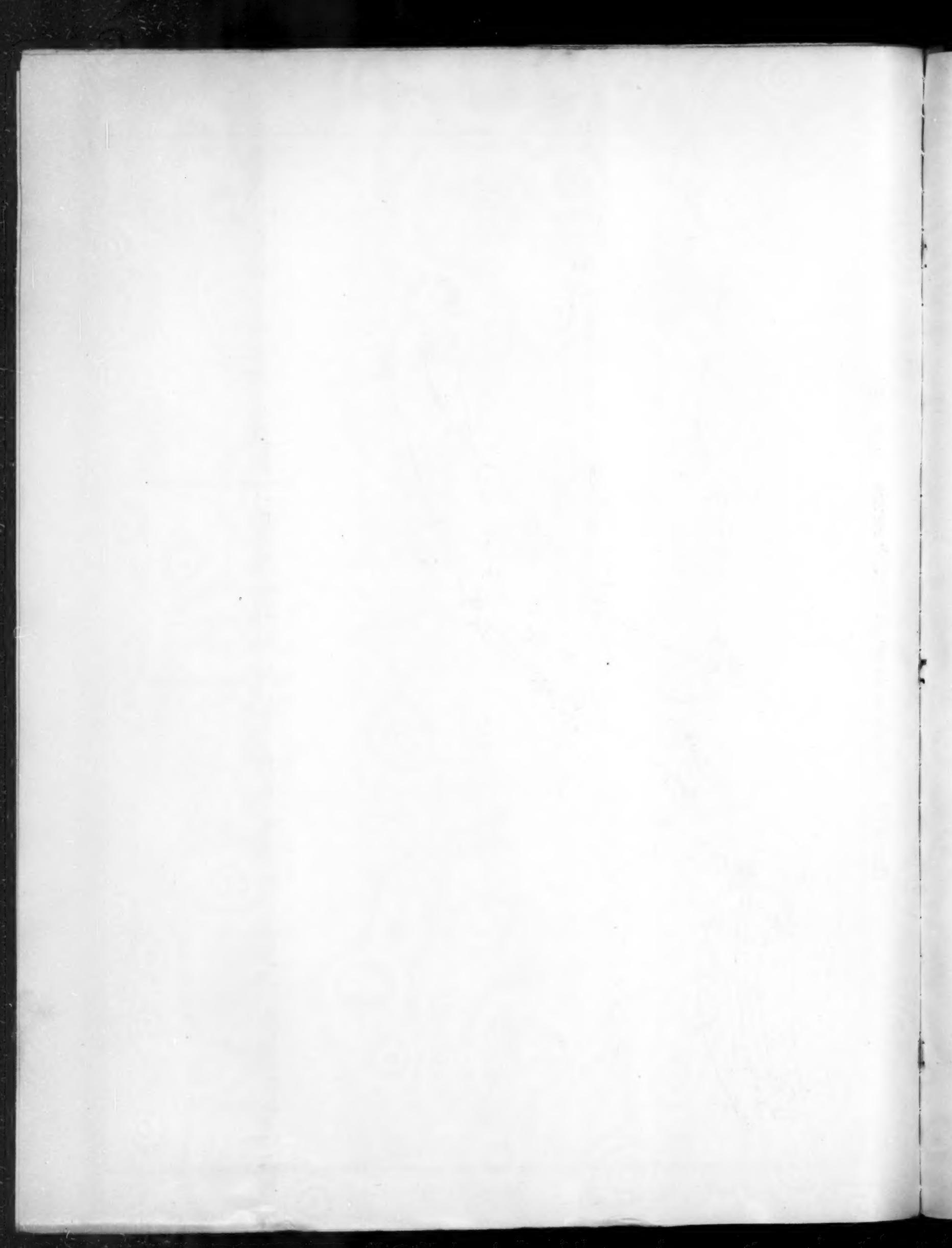
Chart III. Precipitation, July 1891.



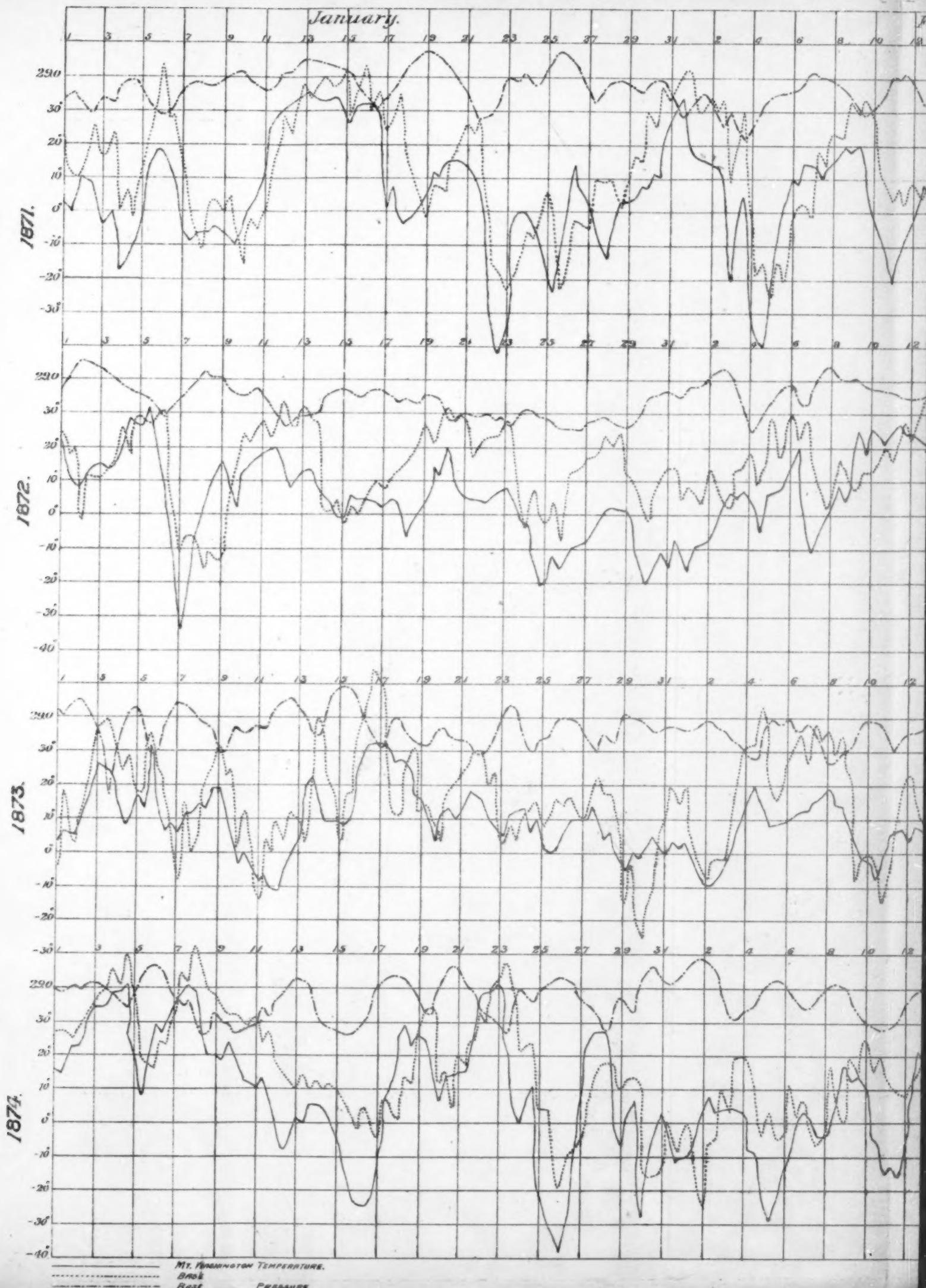


Chart IV. Tracks of Areas of High Pressure. July, 1891.

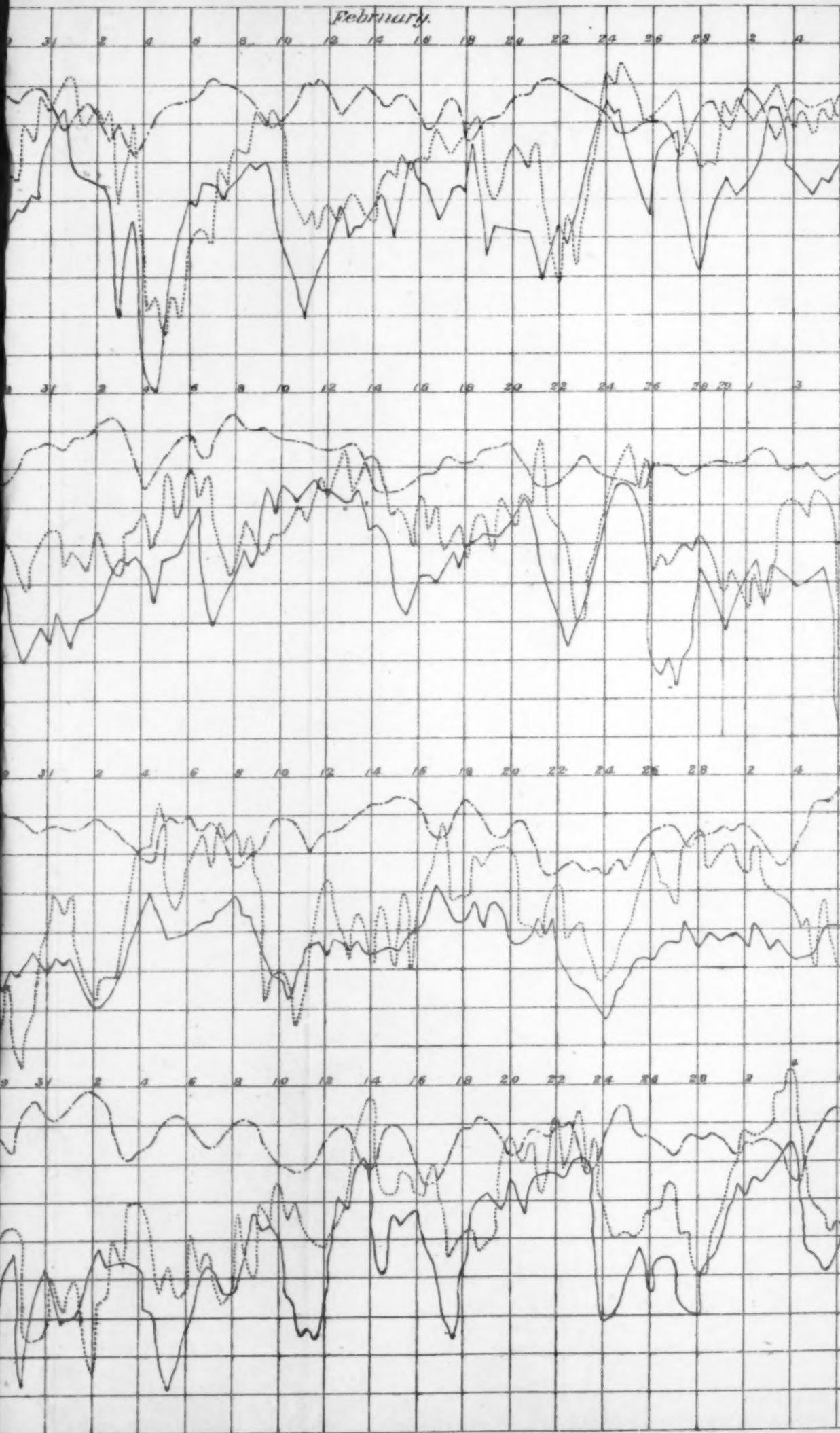




Fluctuations of pressure and temp



of pressure and temperature near Mount Washin



ashington, N. H.

